

IMPORTANT BIRD AND BIODIVERSITY AREAS IN INDIA

Priority sites for Conservation

Revised and updated 2nd Edition Vol. II



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**Second Edition: Revised and Updated
Volume II**

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SIKKIM

IN-SK

DHRTIMAN MUKHERJEE



More than 80% of the total geographical area of Sikkim is under the administrative control of the State Forest Department. There is one national park (Khangchendzonga) and seven wildlife sanctuaries

Sikkim (27° 05'–28° 07' North and 87° 59'–88° 56' East) is one of the smallest and least populous states in India. It covers an area of 7,096 sq. km, extending approximately 114 km from north to south and 64 km from east to west. Wedged in between Nepal in the west and Bhutan in the east, Sikkim is bounded by Darjeeling district of West Bengal in the south and a stretch of Tibetan Plateau in the north. Comprising just 0.22% of the nation's geographical area, Sikkim harbours 33% of India's biodiversity. There are four districts in Sikkim, namely North Sikkim, West Sikkim, South Sikkim and East Sikkim with district headquarters at Mangan, Gyalsing, Namchi and Gangtok respectively.

Sikkim is classified as part of the biogeographic province of central Himalaya which in India includes Darjeeling district of West Bengal with a Temperate Broadleaf forest. The north of Sikkim is a biogeographic province of Trans-Himalayan Tibetan Plateau (Rodgers *et al.* 2000) with biota of Palaearctic affinity.

Sikkim is the wettest region in the entire Himalayan chain as it receives the unobstructed inflow of the southwest monsoon winds from the Bay of Bengal which then precipitate in this region (Ali 1962). It is surrounded by (i) the Singhalila mountain chain culminating in the mighty Khangchendzonga peak which at over 8,598 m is the world's third highest point on the Earth's surface and India's highest peak, (ii) the Chola range and the Chumbi Valley on the

Bhutan-Tibet side and (iii) the main Himalayan axis across the North. This forms a gigantic horseshoe catchment of the River Tista, the lifeline and the main river of Sikkim, and all its feeder streams, viz., Lhonak, Zemu, Lachung, Tolung, Great Rangit, Rongni and Rangpo. The Rangit and the Tista rivers form the main channels of drainage and run nearly from north to south. These perennial rivers are rain-fed and snow-fed. The valleys cut by these rivers and their streams are very deep and mostly forested.

According to human population census of 2011 the State has a population of about 6,10,577, with the density of 86 persons per sq. km. (<http://www.census2011.co.in/census/state/sikkim.html>). The total population of the State forms 0.05 percent of the entire population of India. Almost 75% of the population lives in rural areas. Literacy rate in Sikkim is 81.42 percent, with male and female literacy at 77.38 and 59.63 percent respectively. East Sikkim is the most populous (2,83,583) among the four districts while the lowest population is found in North Sikkim (43,709).

Sikkim's geographical location, with its altitudinal variation, allows it to have sub-tropical temperature conditions in the southern lower parts to tropical, temperate, alpine and cold desert climatic conditions in the snowy north within this small area of 7,096 km. Temperature varies with the altitude and the slope. In lower altitudes, the temperature is between 4.5 °C to 18.5 °C, whereas at

higher altitudes, it varies from 1.5 °C to 9.5 °C. Still higher up, the temperature can go below -30 °C.

The average annual rainfall is 2,739 mm. Rainfall varies widely between sheltered valleys, foothills and high mountains, and is heavy and well distributed from May to early October. July is usually the wettest month. The highest annual rainfall for the individual station may exceed 5000 mm and the average number of rainy days (days with rain of 2.5 mm or more) ranges from 100 at Thangu in North Sikkim to 184 at Gangtok in East Sikkim. The State experiences frequent landslides, an aftermath of the torrential downpours during monsoon. Fog is another common feature from May to September. During winter,

see the weak Sal being slowly dominated by the Pine. These patches are relatively poor in bird life. However, the lowland forests of Sikkim are home to several threatened species of birds such as Vulnerable Rufous-necked Hornbill *Aceros nipalensis*, Great Pied Hornbill *Buceros bicornis*, locally called 'Hongraio', Chestnut-breasted Partridge *Arborophila mandelli*, even the now uncommon Red Junglefowl *Gallus gallus*. Other lowland fauna includes the introduced Peafowl *Pavo cristatus*, Sikkim's largest reptile Burmese Python *Python bivittatus*, house geckos, Himalayan Crestless Porcupine *Hystrix brachyura*, Assamese Macaque *Macaca assamensis*, Chinese Pangolin *Manis crassicaudata* and Barking Deer *Muntiacus muntjak*, a variety of hill-stream



Yumthang Shingba (left) is a good representative of Himalayan Moist Temperate, Subtropical Broadleaf Hill Forest, Subtropical Pine Forest, Alpine Moist Scrub, Alpine Moist Pasture, and Tso Lhamo (right) at the height from 4,500 to 7,000 msl represent Alpine Arid Pasture and Alpine Dry Scrub

temperature rarely rises above 15 °C and snowfall occurs during the winter months in the higher elevations.

Forestry is the major land use in the State and nearly 83% of the total geographical area of the State is under the administrative control of the State Forest Department. This proportion is one of the largest in the country. The Khangchendzonga National Park (1,784 sq. km) is the only National Park in Sikkim and occupies 25.14% of the total geographical area of Sikkim. It is also a proposed World Heritage Site under natural and cultural category. In addition, Sikkim has seven wildlife sanctuaries and one conservation reserve. All of these along with reserve forests together constitute 47.69% of the total geographical area under forest and tree cover, making it the greenest State in the country.

VEGETATION

Covering just 0.22% of the geographical area of India, Sikkim shows great biological diversity. The vast altitudinal variation of elevations from around 300 m to 8,598 m within very short distances is responsible for the varied ecoregions

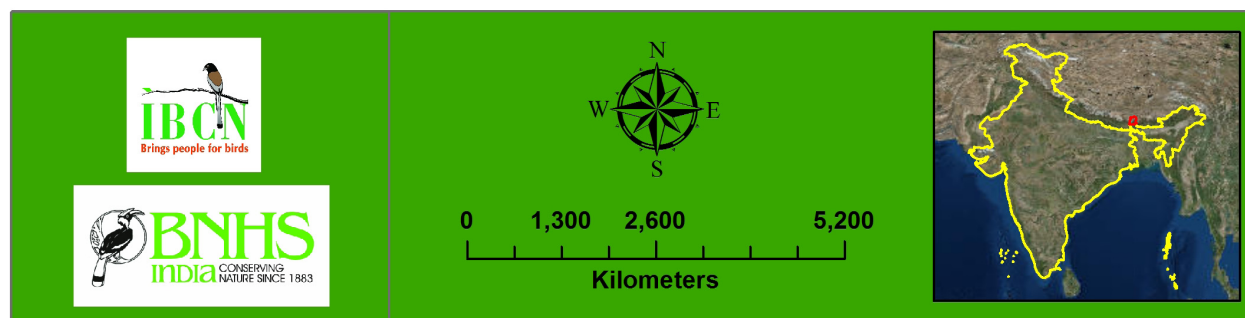
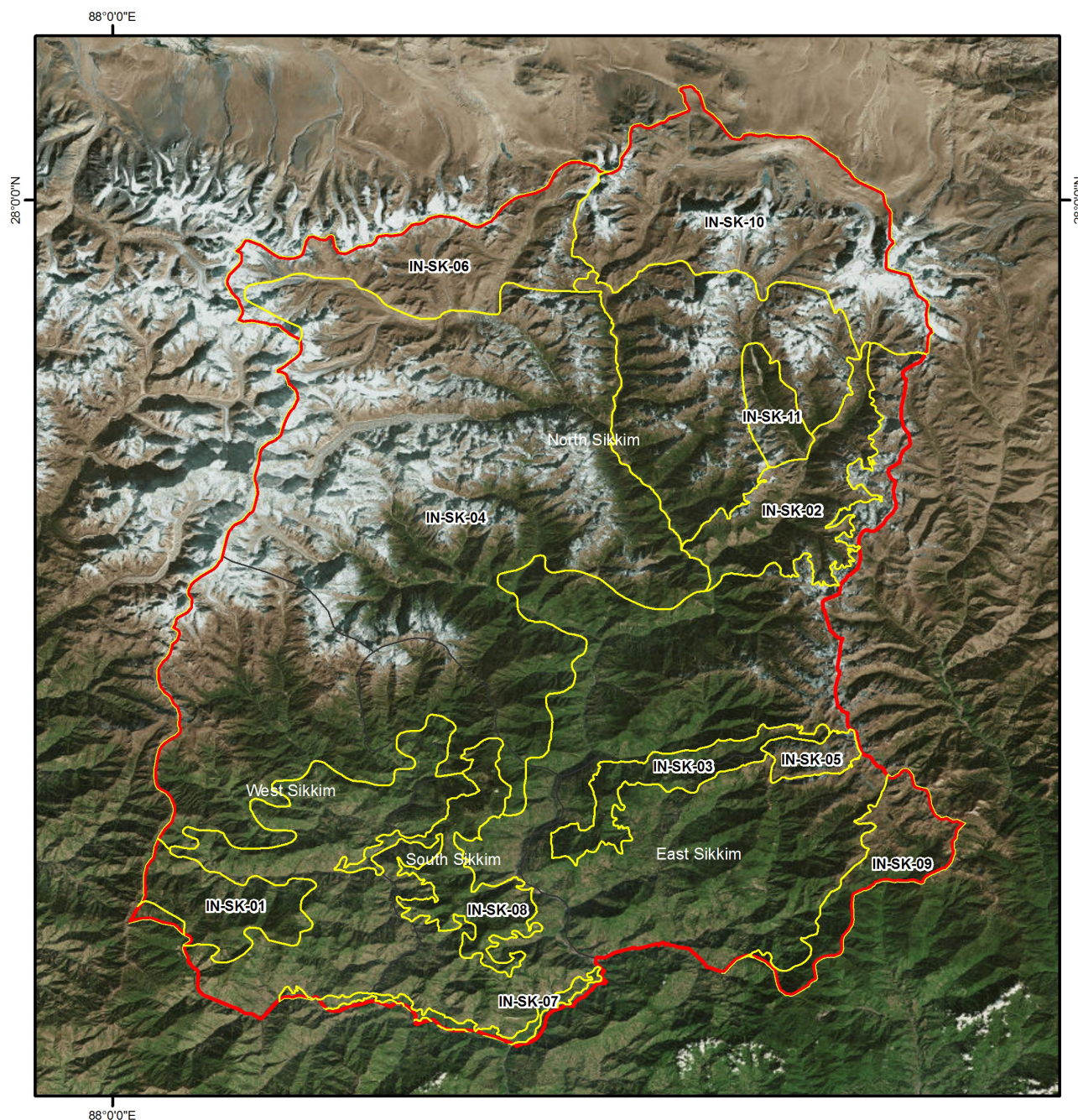
of the State. This is evident from the presence of Sal (*Shorea robusta*) forests in the lowland Rangit Valley in the south, to the temperate fir forests in the north, beyond which lie the Trans-Himalaya and the cold desert of the Tibetan Plateau.

Broadly speaking, there are five altitudinal zones of vegetation, not clear-cut at their boundaries as they merge into one another. They are the Tropical Ecoregion, Sub-Tropical Ecoregion, Temperate Ecoregion, Alpine Forests and Scrub, Trans-Himalayan Ecoregion.

The Tropical Ecoregion extends roughly from the foothills of the Outer Himalaya to an altitude of about 1,200 m. It contains steep-sided valleys and gorges with well-drained, flanking slopes. Various species of orchids, climbers like the robust Aroid *Rhaphidophora*, wild banana *Musa sikkimensis*, *M. balbisiana*, Himalayan Screwpine *Pandanus nepalensis*, Date Palm *Phoenix sylvestris* and the rare *P. rupicola*, the only living fossil tree of Sikkim *Cycas pectinata*, nettles and giant bamboo are characteristic of the region. In the region of Rangit Valley, Sal *Shorea robusta* shows a unique association with the Chir Pine *Pinus roxburghii*. In patches of protected forest, it is possible to

Important Bird Areas in Sikkim

IN-SK



fish, freshwater and tree frogs, toads and a host of butterflies and other invertebrates. Several species of migratory water birds use the river systems during transit. A representative area of 6 sq. km of the Kitam Reserve Forest has been declared as Kitam Bird Sanctuary.

The Sub-Tropical Ecoregion extends from about 1,800 m to 3,000 m. The rainfall in this zone is very heavy and conditions remain humid throughout the year. The upper-storey mainly consists of trees like *Castanopsis hystrix*, *Machilus* spp., *Rhododendron* spp., *Symplocos spicata*, *S. theifolia*, *Michelia excelsa*, *Quercus lamellosa*, *Q. lineata*, *Q. pachyphylla*, *Engelhardia spicata*, and *Leucocephalum canum*. In the understory are *Eurya japonica*, *Rhododendron arboreum* and *Viburnum* spp. In the middle storey, *Symplocos theifolia* is the main species and *Litsea* spp. and *Bucklandia populnea* are other associates. Dense tall evergreen forests with oaks and *Rhododendrons* predominate. The undergrowth consists of the bamboo *Arundinaria maling*, varieties of ferns, epiphytic mosses and orchids. Red Panda *Ailurus fulgens*, Red Fox *Vulpes vulpes*, Golden Jackal *Canis aureus*, Leopard Cat *Prionailurus bengalensis*, Spotted Linsang *Prionodon pardicolor*, Common Leopard *Panthera pardus*, Asiatic Black Bear *Selenarctos himalayanus*, Palm Civet *Paguma larvata*, Flying Squirrel *Petaurista magnificus*, Wild Boar *Sus scrofa* and Barking Deer *Muntiacus muntjak* have been recorded here. This area is also rich in forest birds including the Rusty-bellied Shortwing *Brachypteryx hyperythra*, Lesser Shortwing *Brachypteryx leucophrys*, Kaleej Pheasant *Lophura leucomelanos* and Satyr Tragopan *Tragopan satyra*; reptiles such as Japalura lizards *Japalura* sp., Cobra *Naja naja*, Krait and Mountain Pit Viper *Ovophis monticola*; Himalayan Bullfrog *Paa leibigii*; butterflies, Atlas moth *Attacus atlas*, Moon moth *Actias selene*, jewel beetles and leeches. Fambong Lho and Pangolakha Wildlife Sanctuaries in East Sikkim, Barsey in West Sikkim and Maenam Wildlife Sanctuary in South Sikkim as well as lower fringes of the Khangchendzonga National Park and Biosphere Reserve are the protected IBAs in this ecoregion. Lake Khecheopalri in West Sikkim occasionally hosts the Critically Endangered Baer's Pochard *Aythya baeri* and probably even the Vulnerable Black-necked Crane *Grus nigricollis* (it was photographed by a birdwatcher Roger Ahlman in April 2006 in the reed-beds beside the lake).

The Temperate Ecoregion extends from 3,000 m to 4,000 m, with mixed coniferous forests of Hemlock, Spruce, Pine, Fir and Junipers and with shrubby undergrowth of *Rhododendron* and *Arundinaria* as well as the increasingly rare climber *Aristolochia griffithii* and insectivorous herb *Drosera peltata*. Red Panda *Ailurus fulgens*, Common Langur *Semnopithecus entellus*, Yellow-throated Marten *Martes flavigula*, the Vulnerable Asiatic Black Bear *Ursus thibetanus*, Himalayan Brown Goral *Naemorhaedus goral*,

Himalayan Serow *Capricornis thar* both Near Threatened like Golden Cat *Catopuma temminckii*, Endangered Wild Dog or Dhole *Cuon alpinus*, Vulnerable Clouded Leopard *Neofelis nebulosa*, (all photographed by camera-traps in Khangchendzonga National Park), Himalayan Monal *Lophophorus impejanus*, Fire-tailed Sunbird *Aethopyga ignicauda*, and some species of reptiles and amphibians are characteristic of this region. The Brown Trout *Salmo trutta fario* and Rainbow Trout *Oncorhynchus mykiss* were introduced in high-altitude lake and river systems four decades ago. Tender shoots of *Cardamine macrophylla*, roots of *Arisaema* spp. and fruit of Seabuckthorn *Hippophae salicifolia* are collected for food, medicine and dyes.

The Alpine Forests and Scrub extend up to 4,500 m with small crooked trees and spreading shrubs interspersed with fir and pine. The stunted forest is mainly of Birch *Betula* spp. and *Rhododendron* with alpine herbs like various species of colourful Primulas and Potentillas. Dominant wild fauna include the Endangered Alpine Musk Deer *Moschus chrysogaster*, Near Threatened Himalayan Tahr *Hemitragus jemlahicus*, Blue Sheep or Bharal *Pseudois nayaur*, Blood Pheasant *Ithaginis cruentus* and Ibisbill *Ibidorhyncha struthersii*. River systems harbour some (introduced) Brown Trout *Salmo trutta fario*. Most of the flora of this region attracts interest for medicinal purposes. Dwarf rhododendron leaves are used for burning as incense. An important species recorded from this zone is the caterpillar-fungus *Cordyceps sinensis* which is aggressively harvested by the local people due to its great commercial potential. This region has a very small resident human population, mainly Bhutias and mostly pastoral, herding livestock such as Yak, Dzo (cow-yak hybrid), a few horses and domestic cattle.

The Temperate and Alpine ecoregions are protected in four wildlife sanctuaries at Shingba (north), Kyongnosla (east), Pangolakha (east) and Barsey (west) and one national park namely Khangchendzonga National Park (north and west). They harbour representative biodiversity of these ecoregions. They also harbour many high-altitude glacial lakes and tarns which are important stop-over sites for migratory waterfowl and act as breeding grounds for Brahminy Shelduck *Tadorna ferruginea*, Common Redshank *Tringa totanus* and Ibisbill *Ibidorhyncha struthersii*.

Shingba Rhododendron Sanctuary is home to the endemic *Rhododendron niveum* which has been designated the State Tree of Sikkim. The Kyongnosla Alpine Sanctuary has sheltered the Takin *Budorcas taxicolor*, which wandered over probably from Bhutan in 1999 through the recently declared Pangolakha Wildlife Sanctuary, which itself is contiguous with West Bengal's Neora Valley National Park. One of India's largest bovinds, the Gaur *Bos gaurus*, has been recorded in Pangolakha in the last decade and confirmed with the confiscation of a poached male by the State Forest Department. The 104 sq. km Barsey Rhododendron

IBAs of SIKKIM		
IBA site codes	IBA site names	IBA criteria
IN-SK-01	Barsey Rhododendron Sanctuary	A1, A2, A3
IN-SK-02	Dombang Valley-Lachung-Lema Tsungthang	A1, A2, A3
IN-SK-03	Fambong Lho Wildlife Sanctuary-Himalayan Zoological Park-Ratey Chu Reserve Forest Complex	A1, A2, A3
IN-SK-04	Khangchendzonga National Park and Biosphere Reserve	A1, A2, A3
IN-SK-05	Kyongnosla Alpine Sanctuary-Tsomgo-Tamze-Chola Complex	A1, A2, A3
IN-SK-06	Lhonak Valley	A1, A2, A3
IN-SK-07	Lowland Forests of South Sikkim	A1, A2, A3
IN-SK-08	Maenam Wildlife SanctuaryTendong Reserve Forest	A1, A2, A3
IN-SK-09	Pangolakha Wildlife Sanctuary-Zuluk-Bedang Tso-Natu La Complex	A1, A2, A3
IN-SK-10	Tso Lhamo Plateau-Lashar-Sebu La-Yumesamdong Complex	A1, A2, A3
IN-SK-11	Yumthang-Shingba Rhododendron Wildlife Sanctuary	A1, A2, A3

A1= Threatened species; A2 = Restricted Range species; A3= Biome species; A4=Congregatory species

LIST OF THREATENED BIRDS WITH IBA SITE CODES		
CRITICALLY ENDANGERED		
Baer's Pochard	<i>Aythya baeri</i>	IN-SK-04
White-rumped Vulture	<i>Gyps bengalensis</i>	IN-SK-07
Slender-billed Vulture	<i>Gyps tenuirostris</i>	IN-SK- 07
VULNERABLE		
Pallas's Fish-Eagle	<i>Haliaeetus leucorhynchus</i>	IN-SK-01, 04, 05, 09
Greater Spotted Eagle	<i>Clanga clanga</i>	IN-SK-05, 08, 09, 10
Chest-breasted Hill-partridge	<i>Arborophila mandellii</i>	IN-SK- 07, 08, 09
Black-necked Crane	<i>Grus nigricollis</i>	IN-SK-04, 06, 10
Wood Snipe	<i>Gallinago nemoricola</i>	IN-SK-02, 05, 06, 09, 10, 11
Rufous-necked Hornbill	<i>Aceros nipalensis</i>	IN-SK-07 (?), 08, 09
Slender-billed Babbler	<i>Turdoides longirostris</i>	IN-SK-07, 09
Grey-crowned Prinia	<i>Prinia cinereocapilla</i>	IN-SK-07, 09
Beautiful Nuthatch	<i>Sitta formosa</i>	IN-SK-02, 03, 07
NEAR THREATENED		
Satyr Tragopan	<i>Tragopan satyra</i>	IN-SK-04, 05
Himalayan Griffon	<i>Gyps himalayensis</i>	IN-SK-04, 05, 06, 11
Bearded Vulture	<i>Gypaetus barbatus</i>	IN-SK-04
Ward's Trogon	<i>Harpactes wardi</i>	IN-SK-07, 09
Blyth's Kingfisher	<i>Alcedo hercules</i>	Not recorded in any IBA
Yellow-rumped Honeyguide	<i>Indicator xanthonotus</i>	IN-SK-04
Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>	IN-SK-01, 03, 07, 08
Firethroat	<i>Luscinia pectardens</i>	Not recorded in any IBA
Giant Babax	<i>Babax waddelli</i>	IN-SK-06, 09, 10
Blackish-breasted Babbler	<i>Sphenocichla humei</i>	IN-SK-07, 09
Rufous-throated Wren-babbler	<i>Spelaeornis caudatus</i>	IN-SK-07, 08
ENDEMIC BIRD AREA 130: EASTERN HIMALAYAS		
Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>	IN-SK-01, 03, 07, 08
Hoary-throated Barwing	<i>Actinodura nipalensis</i>	IN-SK-01,02, 03, 04, 05, 06, 08, 09, 10, 11
White-naped Yuhina	<i>Yuhina bakeri</i>	IN-SK-02, 03, 04, 07, 08
Chestnut-breasted Hill-Partridge	<i>Arborophila mandellii</i>	IN-SK- 07, 08, 09
Yellow-vented Warbler	<i>Phylloscopus cantator</i>	IN-SK-04, 07
Ward's Trogon	<i>Harpactes wardii</i>	IN-SK-07, 09
Rufous-throated Wren-babbler	<i>Spelaeornis caudatus</i>	IN-SK-07, 08
Blackish-breasted Babbler	<i>Sphenocichla humei</i>	IN-SK-07, 08
Broad-billed Warbler	<i>Tickellia hodgsoni</i>	IN-SK-02, 06, 08, 09, 10
ENDEMIC BIRD AREA 133: SUTHERN TIBET		
Giant Babax	<i>Babax waddelli</i>	IN-SK-06, 09, 10



DHIRTIMAN WUKHERJEE

Pangolakha WLS adjoins Neora Valley NP (an IBA) in West Bengal and together forms a large protected area, representing Subtropical Pine Forest, Subtropical Broadleaf Hill Forest, Alpine Moist Pasture

Sanctuary with its pure *Rhododendron* stands is contiguous with the Singhalila National Park in West Bengal.

The Trans-Himalayan Ecoregion extends from 4,500 m to over 5,500 m with characteristic cold desert vegetation, exclusively restricted to the north of Sikkim. This ecoregion has not yet been included in the protected area network of the State and is perhaps the most threatened. It contains many globally Threatened species such as the Kiang or Tibetan Wild Ass *Equus kiang*, Near Threatened Nayan or Tibetan Argali *Ovis ammon* and Tibetan Gazelle *Procapra picticaudata*, Endangered Snow Leopard *Panthera uncia*, Eurasian Lynx *Lynx lynx*, Near Threatened Pallas's Cat *Otocolobus manul*, Tibetan Fox *Vulpes ferrilata* and Tibetan Wolf *Canis lupus chanco*. Occurrence of Brown Bear *Ursus arctos* can be confirmed from a report of it preying an injured yak in this region. The Tibetan Snowcock *Tetraogallus tibetanus*, Lammergeier *Gypaetus barbatus*, Golden Eagle *Aquila chrysaetos* and Ruddy Shelduck *Tadorna ferruginea* are also found here. The Vulnerable Black-necked Crane *Grus nigricollis* has attempted breeding here.

The region has a short four-month growing season during which grasses, sedges and medicinal herbs spurt abundantly supporting a host of insect fauna as well as wild and domestic herbivores, Himalayan marmots, pikas, Tibetan and Horned larks, Tibetan Sandgrouse, Red-billed and

Yellow-billed choughs, Black and Guldenstadt's redstarts, pipits, wagtails, and Mountain and Snow finches. Mongolian Plover *Charadrius mongolus* has been seen breeding at a small lake on the border called Bam Tso. There are no permanent settlements. The human population consists of a small number of nomadic Tibetan graziers or 'Dokpas' (who herd Yak, sheep and goats) and a large number of Defence personnel, as the area forms the international border with Tibet Autonomous Region of China.

Forestry Practices: Past and Present

In 1914, the Maharaja of Sikkim, Sidkeong Tulku, the tenth Chogyal, after completing his studies at Oxford University in 1908 was given charge of forests, monasteries and schools. He initiated the demarcation of the forest areas of the then kingdom of Sikkim. Forests that were vital to the life support system and required full protection were set apart as Reserve Forests. These forests were to be left in their natural state and heavy penalties were imposed for illegal activities in these areas. Other forest areas that could be worked on a small scale, in order to meet the timber and fuel-wood requirements of the local populace, were carved out in the vicinity of villages. Those forests were called Khasmal Forests and those that were set apart as grazing grounds for village cattle were called Goucharan

Forests. Forest rules and regulations were instituted for the first time during this period. The Chogyal introduced avenue plantation of trees on either side of bridle paths in Sikkim through public participation; he passed regulations for conserving 50 yards on either side of the rivers Rangit, Tista and their tributaries as River/Khola Reserves and for compulsory bench-terracing of the cultivable land of farmers.

Consequently, the system of exploitation of forests by selection felling, leaving the mother stock intact, was

adopted. Contracts were given for lifting of forest produce from mature forests, and extracted timber was exported with a view to generate revenue to meet increasing expenditure on administration, and to aid natural regeneration. This was supplemented by undertaking plantation work on a limited scale in marginal forests through the Taungyadar system.

In 1975, Sikkim was merged with India as its 22nd State and became part of the Indian Union. Developmental activities accelerated, aided by Central assistance. Construction activities got a boost, and the lifestyle of



Blood Pheasant *Ithaginis cruentus* is the State Bird of Sikkim



Khangchendzonga National Park is a part of Khangchendzonga Biosphere Reserve. Khangchendzonga is considered to be the finest example of an independent mountain having its own glacial system radiating from its several summits. It also boasts of some of the most magnificent snow and ice scenery in the world

the people also improved considerably. The increasing population, coupled with the timber-intensive lifestyle, has since mounted pressure on the forest areas, and the requirement of forest produce for internal consumption has also increased considerably. To augment the growing needs of the people, the State Government has come up with several innovative schemes such as Green Mission, 10-Minutes to Earth, extension of ban on commercial wild harvesting of medicinal plants for another five years, and ecotourism and village tourism.

IBAS AND IBA CRITERIA

Eleven IBAs have been selected in the State. All of them fulfill A1, A2 and A3 criteria. Although some high altitude wetlands are present in the state, none of them fulfill A4 criteria.

AVIFAUNA

“This abrupt telescoping of the terrain — from the hot steamy foothill valleys to the arctic cold of the snowcapped peaks — which has produced the marked altitudinal zonation in the rainfall, humidity, climate and vegetation is also responsible for the great variety and numerical abundance of the resident bird life, making Sikkim perhaps the richest area of its size anywhere in the world” (Ali 1962). In an area of 0.22% of India, the old tally of around 550 bird species represents around 30% of the aggregate bird species and subspecies found in the entire Indian subcontinent. This region of the Central Himalaya lies within the Eastern Himalaya Endemic Bird Area (EBA) and for several bird species such as Chestnut-breasted Partridge *Arborophila mandelli*, Rusty-bellied Shortwing *Brachypteryx hypertyra*

and White-naped Yuhina *Yuhina bakeri* this EBA is very important. It also has globally Threatened species such as the Black-necked Crane *Grus nigricollis*.

New bird species recorded after 2004

Blyth's Rosefinch *Carpodactus grandis*

Rahut *et al.* (2012) sighted and photographed a rosefinch from Lungthu, Pangolakha Wildlife Sanctuary (IN-SK-09). After comparing the morphological characters of the bird they concluded it to be Blyth's Rosefinch. This is the first photographic record of this species from Sikkim.

CONSERVATION ISSUES

Despite the fact that around 83% of Sikkim is under forest cover and the human population is relatively low, the State suffers from issues impacting conservation such as need for fuelwood and fodder, increase in human-wildlife conflicts, increase in the population of stray and feral dogs as well as feral cats in urban areas. Hunting is not a major issue in any IBA but sustainability of increasing tourism in forests and wildlife protected areas needs to be addressed.

In the tropical Ecoregion at lower elevations, *Lantana camara* and *Mikania micrantha* are major weeds. Forest fires are generally reported from this zone and there is an occasional problem of illegal removal of Sal and Teak trees. New hydroelectric projects have also been taken up in this zone. This ecoregion is not well represented in the protected area network, with only 6 sq. km of Kitam Reserve Forest declared as Kitam Bird Sanctuary, in and around which the Common Peafowl has become a crop predator much like the barking deer, porcupine, Assamese macaques and the invasive Giant African Snail *Lissachatina fulica*.



Darjeeling Pied Woodpecker *Dendrocopos darjellensis* is found from central Nepal, Bhutan, Sikkim to western Myanmar, and parts of China. It is listed in Biome 7 (Sino-Himalayan Temperate Forest) of Birdlife International

In the Sub-Tropical Ecoregion *Eupatorium adenophorum*, *Chromolaena odorata*, and *Mikania micrantha* are major weeds competing with *Artemisia vulgaris* and other secondary growth. Large Cardamom *Ammomum subulatum* under-planted in forest patches and a tea garden at Temi are dominant features of the landscape, as much as naturalized exotic *Cryptomeria japonica* patches.

The Temperate, Alpine and Trans-Himalayan Ecoregions are home to about 90% of the Yak population of Sikkim. These ecoregions are also rich in medicinal plants. Trans-Himalayan Sikkim supports the only true alpine grasslands in the State. Closure of the International Border to transhumance over the last three decades has led to intense grazing pressure by both domestic and wild herbivores on the land. Issues in the area include presence of landmines, existence of stray and feral dogs around Defence settlements and increasing volume of tourism with attendant need for solid waste management which is being attempted by NGOs like World Wide Fund for Nature–India.

The Trans-Himalayan Ecoregion with its lakes and glaciers urgently needs to be represented in the protected area network of the State. At present the area has a host of biotic pressures, which need urgent mitigation. There

is a lack of awareness about the need for conservation, the undecided status and future of the last 23 families of nomadic shepherds or ‘Dokpas’, an increase in the numbers of free-ranging dogs, and an increase in various Defence priorities including camps for migrant labourers working on road construction and maintenance. It is also the only area which cannot be patrolled regularly without proper transport and communication facilities due to its extremely high altitude (over 5,000 m), inhospitable weather and inaccessibility. Interference in this fragile ecosystem would damage the area irretrievably.

Sikkim has innumerable number of rivers and streams flowing down the glaciers, which provide abundant potential for hydroelectric power projects. It is estimated that Sikkim has potential to generate 8,000 MW seasonally and about 3,000 MW power during winter months (Rajvanshi *et al.* 2000). The river Tista has the potential to generate huge hydroelectric power as it descends from an elevation of about 5000 m to about 300 m, within a distance of 175 km. Great care needs to be exercised at every step of the way to avoid threats to many IBAs especially the Khangchendzonga National Park and Biosphere Reserve, a proposed World Heritage Site.



Rufous Sibia



Black-faced Laughingthrush



White-browed Rosefinch



Golden Spectacled Warbler



Gold-naped Finch



Bullfinch



White-browed Fulvetta



Red-tailed Minla



White-tailed Nuthatch

Nearly 550 bird species are found in Sikkim. The state is now becoming a major bird tourism destination



DHRTIMAN MUKHERJEE

Ranging from 2,000 msl to 4,100 msl, the 104 sq. km. Barsey WLS is a fine example of Subtropical Dry Evergreen, Subtropical Broadleaf Hill Forest, and Alpine Moist Scrub. Bird species from biomes 5, 7, 8 and 9 have been recorded here, including few globally threatened species

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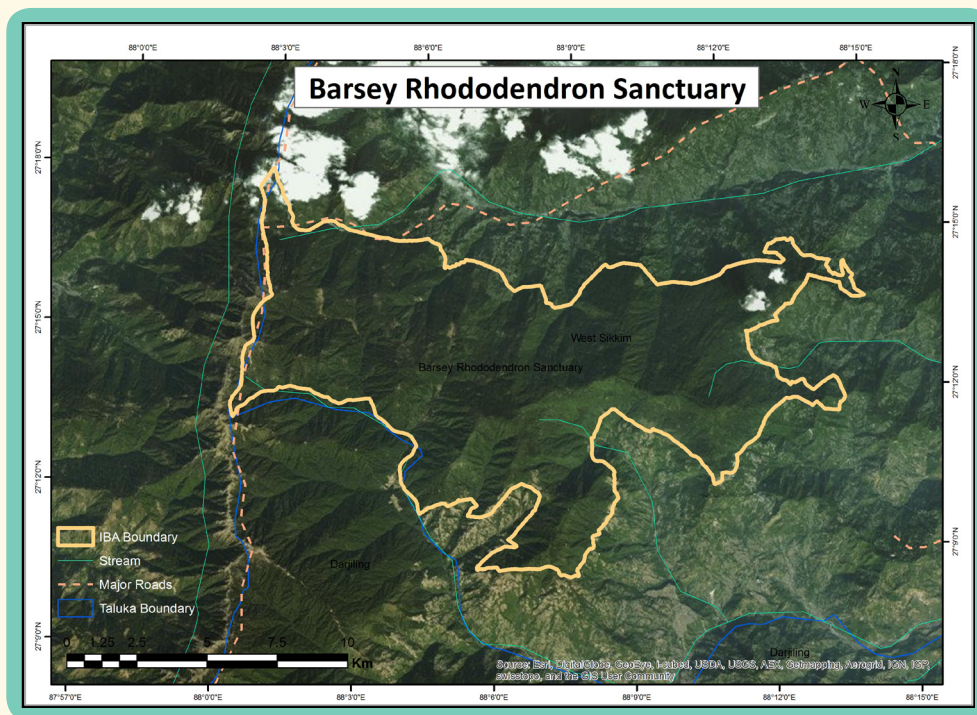
BARSEY RHODODENDRON SANCTUARY

IN-SK-01

IBA Site Code	: IN--SK--01	Altitude	: 2,000 – 4,100 msl
State	: Sikkim	Rainfall	: >250 cm
District	: West Sikkim	Temperature	: Not Available
Coordinates	: 27° 11' 39" N, 88° 07' 06" E	Biogeographic Zone	: Himalaya
Ownership	: State Forest Department	Habitats	: Subtropical Dry Evergreen, Subtropical Broadleaf Hill Forest, Alpine Moist Scrub
Area	: 10,400 ha		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 130: Eastern Himalaya);
A3 (Biome 5: Eurasian High Montane; Biome 7: Sino-Himalayan Temperate Forest)

PROTECTION STATUS: Wildlife Sanctuary, established in 1996



GENERAL DESCRIPTION

The 104 sq. km Barsey Rhododendron Sanctuary forms a vital corridor along the Sikkim Nepal border connecting the Khangchendzonga National Park and Biosphere Reserve (KNP--KBR) to its north with the Singhalila National Park of West Bengal to its south. Five forest types are seen in this site: Subtropical Moist Deciduous Forests (2,200-2,400 m); Wet Temperate Forests (2,400-2,700 m); Moist Temperate Forests (2,700-3,250 m); Sub-alpine Forests (3,250-4,000 m), and Alpine meadows (>4,000 m) (Sharma 2001). These diverse forest types shelter a wide range of faunal and floral elements. This Sanctuary harbours some pure stands of Rhododendron, the dominant genus favored by the wet and cold climate along the Singhalila Range and a variety of epiphytic orchids, ferns, mosses and lichens. Meadows take

over from above 4,000 m and are rich in medicinal plants.

AVIFAUNA

This is an important IBA on the southeast corner of Sikkim, with Nepal as its western border and contiguity with KBR and Singhalila, stretching from alpine meadows down to subtropical forests. Birds from biomes 5, 7, 8 and 9 have been recorded here including at least two globally threatened species, two restricted range species, five out of 48 Biome 5 species and 38 out of 112 Biome 7 species,. However, much more research input is needed. During a brief survey in September 1996, Biome 7 birds such as White-browed Tit-Babbler *Alcippe vinipectus*, Rufous Sibia *Heterophasia capistrata*, Ashy-throated Warbler (Grey-faced Leaf-Warbler) *Phylloscopus maculipennis*, Rufous-gorgeted

VULNERABLE

Pallas's Fish-Eagle	<i>Haliaeetus leucoryphus</i>
Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>

ENDEMIC BIRD AREA-130: EASTERN HIMALAYAS

Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>
Hoary-throated Barwing	<i>Actinodura nipalensis</i>

BIOME 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Snow Partridge	<i>Lerwa lerwa</i>
Snow Pigeon	<i>Columba leuconota</i>
Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>
Wallcreeper	<i>Tichodroma muraria</i>
Yellow-billed Chough	<i>Pyrhcorax graculus</i>

BIOME 7: SINO-HIMALAYAN TEMPERATE FOREST

Hill Partridge	<i>Arborophila torqueola</i>
Blood Pheasant	<i>Ithaginis cruentus</i>
Satyr Tragopan	
Himalayan Monal	<i>Lophophorus impejanus</i>
Speckled Woodpigeon	<i>Columba hodgsonii</i>
Darjeeling Woodpecker	<i>Dendrocopos darjellensis</i>
Nepal House-martin	<i>Delichon nipalensis</i>
Long-billed Thrush	<i>Zoothera monticola</i>
White-collared Blackbird	<i>Turdus albocinctus</i>
Streaked Laughingthrush	<i>Garrulax lineatus</i>
Black-faced Laughingthrush	<i>Garrulax affinis</i>
Scaly-breasted Wren-babbler	<i>Pnoepyga albiventer</i>
Green Shrike-babbler	<i>Pteruthius xanthochlorus</i>
Bar-throated Minla	<i>Minla strigula</i>
Red-tailed Minla	<i>Minla ignotincta</i>
White-browed Fulvetta	<i>Alcippe vinipectus</i>
Rufous Sibia	<i>Heterophasia capistrata</i>
Rufous-vented Yuhina	<i>Yuhina occipitalis</i>
Great Parrotbill	<i>Conostoma oemodim</i>
Fulvous-fronted Parrotbill	<i>Paradoxornis fulvifrons</i>
Ashy-throated Warbler	<i>Phylloscopus maculipennis</i>
(Grey-faced Leaf-Warbler)	
Ferruginous Flycatcher	<i>Muscicapa ferruginea</i>
Slaty-backed Flycatcher	<i>Ficedula hodgsonii</i>
Rufous-gorgeted Flycatcher	<i>Ficedula strophilata</i>
Rufous-bellied Niltava	<i>Niltava sundara</i>
Rufous-fronted Tit	<i>Aegithalos iouschistos</i>
Fire-capped Tit	<i>Cephalopyrus flammiceps</i>
Rufous-vented Tit	<i>Parus rubidiventris</i>
Brown Crested Tit	<i>Parus dichrous</i>
Green-backed Tit	<i>Parus monticolus</i>
White-tailed Nuthatch	<i>Sitta himalayensis</i>
Rusty-flanked Treecreeper	<i>Certhia nipalensis</i>
Fire-tailed Sunbird	<i>Aethopyga ignicauda</i>
Dark-breasted Rosefinch	<i>Carpodacus nipalensis</i>
Brown Bullfinch	<i>Pyrhula nipalensis</i>
Red-headed Bullfinch	<i>Pyrhula erythrocephala</i>
Gold-naped Finch	<i>Pyrhoplectes epauletta</i>
Gold-billed Magpie	<i>Urocissa flavirostris</i>

Flycatcher *Ficedula strophilata*, Rufous-bellied Niltava *Niltava sundara*, Rufous-vented Tit *Parus rubidiventris* and Red-headed Bullfinch *Pyrhula erythrocephala* were ringed with BNHS rings (Ganguli-Lachungpa 1996).

OTHER KEY FAUNA

Notable mammals include Leopard *Panthera pardus*, Clouded Leopard *Neofelis nebulosa* Leopard Cat *Prionailurus bengalensis*, Spotted Linsang *Prionodon pardiolus*, Yellow-throated Marten *Martes flavigula*, Masked Palm Civet *Paguma larvata*, Common Palm Civet *Paradoxurus hermaphroditus*, Goral *Nemorhaedus goral*, Barking Deer *Muntiacus muntjak*, Asian Black Bear *Ursus thibetanus*, Red Panda *Ailurus fulgens*, Himalayan Crestless Porcupine *Hystrix brachyura*, and Himalayan Mouse-Hare or Royle's Pika *Ochotona roylei*. Wild Dog *Cuon alpinus* is reported to prey on domestic livestock. Research is also needed on the herpetofauna and invertebrates of this IBA.

LAND USE

- Forestry
- Nature conservation and research
- Eco-tourism and recreation

CONSERVATION ISSUES

- Livestock grazing
- Collection of medicinal plants
- Recreation and tourism

Threats to forests in this IBA have been large volume of tourists during flowering season of Rhododendrons, contiguity with the heavily trekked neighbouring Singhalila National Park of West Bengal, porous border with Nepal, yak and cow sheds, shepherds' activities, tree felling in forests, firewood and fodder collection, cattle influx from Nepal and landslides. Yak grazing was not a traditional activity but was started by foreign nationals from Nepal, with yak sheds multiplying from 1975 onwards. More than the yaks, it was the caretaker who caused maximum damage through firewood collection, lopping of trees for fodder, smuggling of medicinal plants, hunting and trapping wild animals. In spring (March), once the snow starts melting, these graziers undertake transhumance to the higher summer grazing grounds, moving in the peak monsoons along the traditional migration routes and camping in temporary yak sheds. Before the first snow arrives in November, they move back loaded with dairy products.

The areas adjacent to the yak sheds and their migration route are heavily overgrazed and consequently degraded (Tambe 2001). There is proliferation of unpalatable species around these sheds, namely *Potentilla peduncularis*, *Meconopsis paniculata*, and *Caltha palustris* in the alpine regions and *Rumex nepalensis*, *Berberis* and *Rosa* spp. in the temperate regions.

The main cause of concern is the intensive, localized collection of firewood from forests adjoining the yak sheds. At these altitudes, firewood is the only source of energy, which is met mostly from the slow growing *Rhododendron* shrubbery and Junipers. The graziers, especially the sheep graziers, indulge in trapping of pheasants and wild mammals. The sheep dogs which are of immense utility to the graziers in rounding up livestock are let loose during the night. They cause depredation of pheasants, other ground nesting birds and their nestlings. Even small mammals are not spared. This has resulted in wildlife becoming very shy, and as a result sightings are rare. Hence, though grazing *per se* may not be that damaging, the allied activities involved have highly deleterious impact on the biodiversity values of the Singhalila range that comprise this IBA.

Controlled tourism and livestock husbandry are the only two economic activities ecologically feasible in this region. Conventionally 'Eco-development' is carried out outside the Sanctuary facilitated by the State Forest Department and aims at reducing the negative dependencies of the local communities on the natural resources of the Sanctuary, the logic behind this approach being improving the socio-economic status of the "High Impact Group". In the context of Barsey *Rhododendron* Sanctuary, the graziers constituted the "High Impact Group" and stayed right within the Sanctuary for all twelve months of the year. Considering the kind of hardships they underwent in the tough terrain and inclement weather, most of them were eager to shift out to other alternate livelihoods. Removing these graziers in a phased manner and employing a participatory approach with some kind of capacity building and institutional support were the biggest contributions to the well being of this unique ecosystem (Sharma 2001). This was initiated in 2001 and the State Forest Department successfully removed cattle sheds from the Sanctuary (Sandeep Tambe *pers. comm.* 2003).

In 2012, the Institute for Financial Management and Research – Centre for Development Finance (IFMR-CDF), Chennai completed a study in this IBA titled "Study of Ecological and Social Dimensions of Grazing Exclusion in Protected Forests of West Sikkim", to document the effects

of the 1998-ban on open grazing in reserved forest areas. The ecological impacts of this ban were recorded as positive with increase in vegetation cover and improvement in the soil regime, but inadequate regeneration of important fodder trees coupled with gregarious thickets of bamboo and *Viburnum*. On the other hand the community perception was of increased cases of crop predation by wildlife, giving policy makers a challenging task. A fresh study of the bird life of this IBA is required as it would greatly add to its ecotourism potential.

Changing livelihoods more geared towards home-stay and village eco-tourism have resulted in various initiatives like birding guide training programmes in fringe villages like Uttarey by involving local NGOs like Sikkim Ornithological Society, and setting up of Biodiversity Management Committees and their capacity building for documenting biodiversity.

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DOMBANG VALLEY-LACHUNG-LEMA-TSUNTHANG

IBA Site Code : IN-SK-02

State : Sikkim

District : North Sikkim

Coordinates : 27° 37' 60" N, 88° 45' 00" E

Ownership : Mixed (Village, Forest, GREF and Army land)

Area : 60,000 ha

Altitude : 2,679 msl

Rainfall : Not Available

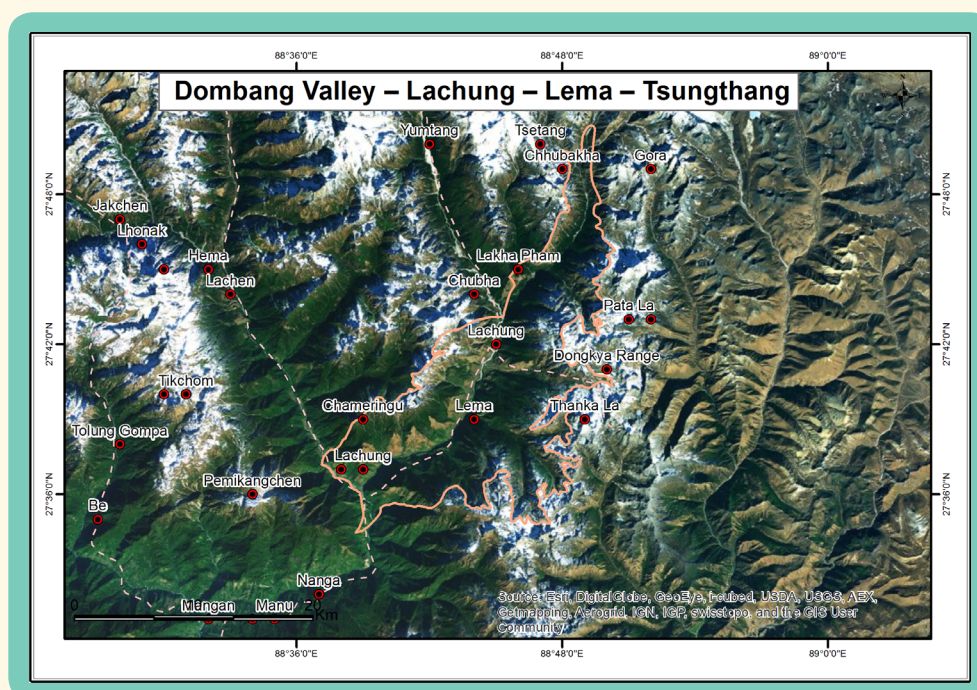
Temperature : -10 °C to 25 °C

Biogeographic Zone : Trans-Himalaya

Habitats : Hilly Evergreen Forest, Montane Broadleaf Evergreen and Deciduous Forest, Montane Mixed Broadleaf-Coniferous Forest

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 130: Eastern Himalaya), A3 (Biome 5: Eurasian High Montane; Biome 7: Sino-Himalayan Temperate Forest; Biome 8: Sino-Himalayan Subtropical Forest)

PROTECTION STATUS: Not officially protected



GENERAL DESCRIPTION

This is a large IBA on village land, Forest Department land and land under the control of the army and GREF. The total area could be more than 60,000 ha. Starting from the small lowland township of Tsunthang situated at the confluence of the Lachung and Tista rivers and moving upwards along small hamlets in Bop, Maltin, Khedum, Lema, Beechu, Lachung, Sharchok and Dombang, the IBA is spread across the narrow river valley of the Lachung in North Sikkim. Lachung is the northernmost frontier village in this valley. Hence, there is heavy army deployment in the area. This IBA is subjected to seasonal grazing by livestock such as highland cows, yak and horses.

From subtropical Tsunthang up to temperate Dombang Valley with hamlets and villages along Lachung Chu and forest patches under-planted with Large Cardamom *Amomum*

subulatum by the ethnic Lepcha and Bhutia tribes, there are mostly village lands with subsistence cultivation and Reserve Forests on the upper slopes. The Mixed Coniferous Forests of Hemlock, Spruce, Pine, Fir and Junipers with shrubby undergrowth of *Rhododendron* and *Arundinaria* at Dombang give way to Alder *Alnus nipalensis* and Poplars towards Tsunthang. The degraded areas are overrun by the ubiquitous *Eupatorium* and *Chromolaena* weeds, exotic invasives locally called 'Kali-Jhar' and 'Ban-Mara' or 'Forest Killer'.

Some of the interesting plants found here are the little carnivorous herb *Drosera peltata*, the large flowered climber *Aristolochia griffithii*, which strangely does not seem to serve as a larval host plant for some papilionid butterflies, and the aquatic *Potamogeton nodosus* which grows in hot springs. The area also boasts of a large number of medicinal herbs and alpine flowers attracting many tourists.

AVIFAUNA

A full checklist of this site is not available but the bird records maintained by U. Lachungpa show that this area could have significant populations of Vulnerable Beautiful Nuthatch *Sitta formosa* and Wood Snipe *Gallinago nemoricola*.

The site lies in the Eastern Himalaya Endemic Bird Area (EBA 130) where Stattersfield *et al.* (1998) have identified 21 restricted range species. Of these, Hoary-throated Barwing *Actinodura nipalensis*, White-naped Yuhina *Yuhina bakeri* and Broad-billed Warbler *Tickellia hodgsoni* have been noticed till now but looking at the extent of pristine habitat still available in this site and paucity of recent field surveys, more restricted range species are likely to be found here.

VULNERABLE

Wood Snipe	<i>Gallinago nemoricola</i>
Beautiful Nuthatch	<i>Sitta formosa</i>

ENDEMIC BIRD AREA 130: EASTERN HIMALAYAS

Hoary-throated Barwing	<i>Actinodura nipalensis</i>
White-naped Yuhina	<i>Yuhina bakeri</i>
Broad-billed Warbler	<i>Tickellia hodgsoni</i>

BIOME 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Himalayan Griffon	<i>Gyps himalayensis</i>
Snow Partridge	<i>Lerwa lerwa</i>
Solitary Snipe	<i>Gallinago solitaria</i>
Ibisbill	<i>Ibidorhyncha struthersii</i>
Snow Pigeon	<i>Columba leuconota</i>
Rosy Pipit	<i>Anthus roseatus</i>
Grey-backed Shrike	<i>Lanius tephronotus</i>
Alpine Accentor	<i>Prunella collaris</i>
Altai Accentor	<i>Prunella himalayana</i>
Plain-backed Thrush	<i>Zoothera mollissima</i>
Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>
White-winged Redstart	<i>Phoenicurus erythrogaster</i>
Grandala	<i>Grandala coelicolor</i>
Tickell's Leaf-Warbler	<i>Phylloscopus affinis</i>
Wallcreeper	<i>Tichodroma muraria</i>
Plain Mountain-Finch	<i>Leucosticte nemoricola</i>
Beautiful Rosefinch	<i>Carpodacus pulcherrimus</i>
Great Rosefinch	<i>Carpodacus rubicilla</i>
Yellow-billed Chough	<i>Pyrhocorax graculus</i>

BIOME 7: SINO-HIMALAYAN TEMPERATE FOREST

Hill Partridge	<i>Arborophila torqueola</i>
Blood Pheasant	<i>Ithaginis cruentus</i>
Satyr Tragopan	<i>Tragopan satyra</i>
Himalayan Monal	<i>Lophophorus impejanus</i>
Speckled Woodpigeon	<i>Columba hodgsonii</i>
Darjeeling Woodpecker	<i>Dendrocopos darjellensis</i>
Nepal House-martin	<i>Delichon nipalensis</i>
Rufous-breasted Accentor	<i>Prunella strophilata</i>
Long-tailed Thrush	<i>Zoothera dixonii</i>
Indian Blue Robin	<i>Luscinia brunnea</i>
White-browed Bush-Robin	<i>Tarsiger indicus</i>
Rufous-breasted Bush-Robin	<i>Tarsiger hyperythrus</i>
White-throated Redstart	<i>Phoenicurus schisticeps</i>
White-throated Laughingthrush	<i>Garrulax albogularis</i>

Striated Laughingthrush	<i>Garrulax striatus</i>
Spotted Laughingthrush	<i>Garrulax ocellatus</i>
Scaly Laughingthrush	<i>Garrulax subunicolor</i>
Black-faced Laughingthrush	<i>Garrulax affinis</i>
Slender-billed Scimitar-babbler	<i>Xiphirhynchus superciliosus</i>
Scaly-breasted Wren-babbler	<i>Pnoepyga albiventer</i>
Green Shrike-babbler	<i>Pteruthius xanthochlorus</i>
Bar-throated Minla	<i>Minla strigula</i>
Red-tailed Minla	<i>Minla ignotincta</i>
Golden-breasted Fulvetta	<i>Alcippe chrysotis</i>
White-browed Fulvetta	<i>Alcippe vinipectus</i>
Rufous Sibia	<i>Heterophasia capistrata</i>
Stripe-throated Yuhina	<i>Yuhina gularis</i>
Rufous-vented Yuhina	<i>Yuhina occipitalis</i>
Brown Parrotbill	<i>Paradoxornis unicolor</i>
Black-throated Parrotbill	<i>Paradoxornis nipalensis</i>
Chestnut-crowned Bush-warbler	<i>Cettia major</i>
Grey-sided Bush-warbler	<i>Cettia brunifrons</i>
Grey-faced Leaf-warbler	<i>Phylloscopus maculipennis</i>
Rufous-gorgeted Flycatcher	<i>Ficedula strophilata</i>
Rufous-fronted Tit	<i>Aegithalos iouschistos</i>
Rufous-vented Tit	<i>Periparus rubidiventris</i>
Grey Crested Tit	<i>Lophophanes dichrous</i>
Green-backed Tit	<i>Parus monticolus</i>
Yellow-browed Tit	<i>Sylviparus modestus</i>
White-tailed Nuthatch	<i>Sitta himalayensis</i>
Rusty-flanked Treecreeper	<i>Certhia nipalensis</i>
Fire-tailed Sunbird	<i>Aethopyga ignicauda</i>
Yellow-breasted Greenfinch	<i>Carduelis spinoides</i>
Dark-rumped Rosefinch	<i>Carpodacus edwardsii</i>
White-browed Rosefinch	<i>Carpodacus thura</i>
Brown Bullfinch	<i>Pyrhula nipalensis</i>
Red-headed Bullfinch	<i>Pyrhula erythrocephala</i>
White-winged Grosbeak	<i>Mycerobas carnipes</i>
Gold-billed Magpie	<i>Urocissa flavirostris</i>

OTHER KEY FAUNA

Notable mammals are Yellow-throated Marten *Martes flavigula*, Leopard Cat *Prionailurus bengalensis*, Spotted Linsang *Prionodon pardicolor*, Asiatic Black Bear *Ursus thibetanus*, Himalayan Goral *Naemorhaedus goral*, Himalayan Serow *Capricornis thar*, Barking Deer *Muntiacus muntjak*, Weasels *Mustela* spp., Orange-bellied Squirrel *Dremomys lokriah* and Himalayan Palm Civet *Paguma larvata*. The IBA's small carnivore population needs assessment. The Sikkim Snow Toad *Scutiger sikkimensis* is an important high altitude amphibian in this IBA, as are the reptiles such as the harmless Slender Grass Snake *Trachischium guentheri*, the venomous Monocled Cobra *Naja kaouthia*, and Himalayan Pit Viper *Gloydius himalayanus*. These and other herpetofauna as well as butterflies like Common Yellow Swallowtail *Papilio machaon* found in this IBA need further study. In 2011, a rare butterfly species endemic to the Himalaya and protected under Schedule 1 of the Indian Wildlife (Protection) Act 1972—the Bhutan Treebrown *Lethe margaritae*—was rediscovered at Tsunthang after it was first reported in 1913 and is only the second record of the species in the past 100 years throughout its range (Rai, Bhutia and

Kunte 2012). Thus the entire IBA is an important bird and biodiversity hotspot.

LAND USE

- Agriculture
- Fisheries and aquaculture
- Forestry
- Military
- Tourism and recreation

CONSERVATION ISSUES

- Landslides and gully formation due to road construction and maintenance activities
- Poaching of wildlife
- Stray and free-ranging dogs; human-wildlife conflicts
- Solid waste management and river pollution
- Uncontrolled tourism

Subsistence farming of wheat, barley and maize as well as mustards and beans is practiced while potato, cabbage and large cardamom are grown as cash crops. Some amount of cattle rearing is practiced with stall-fed hybrid milch cows and the rest are left to graze in the forest fringe areas. Handloom cottage industry for making blankets, rugs and carpets provides alternative employment. Farm trials of apples, exotic Lilies, Angora Rabbits and improved livestock breeds have been conducted here by the government. With the State becoming completely organic by December 2015, the stage is set for more eco-friendly treatment of the farmed lands.

A major earthquake measuring 6.9 on the Richter scale hit Sikkim and especially this IBA on September 18, 2011 at 5.10 p.m., causing extensive landslides and landslips disrupting the entire geology of the area, burying private and government farms under avalanches of debris. Interestingly exactly a year later at 5:55 p.m. on September 18, 2012, another earthquake of magnitude 4.1 struck Sikkim, sparking panic among the people observing the anniversary of the original quake.

In addition, constant heavy traffic on the roads in this IBA and prevailing practices of road construction often using dynamite are responsible for many landslips and slides causing much loss of vegetation cover, besides destabilizing the landscape.

As the area is near the international border between India and Tibet Autonomous Region (TAR) of China, there is heavy army deployment. Their role so far has been limited to border security, but now they should be given a major role in the protection of the area's biodiversity in collaboration with the State Forest Department and local communities. The State Forest Department lacks manpower and infrastructure to patrol these areas.

Road maintenance workers of the Border Roads Organisation often depend on easily available fuel wood around their shifting camps instead of kerosene that has to be purchased. There are also stray reports of poaching of wildlife from such areas. Increasing population of stray and feral dogs is a major menace here which needs to be urgently addressed. Besides, there also have been instances of crop predation by macaques, wild boar and Asiatic Black Bears. The latter are often attracted to garbage improperly accumulated due to increasing tourism pressures.

An efficient system of waste disposal from the cantonments as well as villages and townships between Dombang, Lachung and Tsunthang catering to mass tourism is urgently required so that garbage is not disposed off the hillside into the Lachung river. More non-biodegradable waste is noticeable nowadays with increase in tourism pressure and the change from tinned milk products to cartons and tetrapacks, for which some segregation and collection has been initiated in collaboration with the Indian Army.

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growth consists of shrubby to small trees of *Viburnum*, *Symplocos*, *Edgeworthia* and lots of bamboo, mixed with few large trees of Mahua *Madhuca longifolia* or *Engelhardtia spicata*. Some patches have been planted up with Japanese Cedar *Cryptomeria japonica* which have now grown quite dense in some places, providing cover to the roosting Kalij Pheasants *Lophura leucomelanos* or other birds during hailstorms. The IBA is also home to a large number of wild orchids, mosses, ferns and *Lycopodium* spp. (Anon. 2002).

AVIFAUNA

Over 281 species of birds have been reported from this IBA, including from the bustling township of Gangtok (Anon. 2002). Of these, the White-rumped Vulture *Gyps bengalensis* has not been seen since the slaughterhouse at Gangtok was shifted south to Rangpo almost two decades ago. The Rufous-necked Hornbill *Aceros nipalensis* and Red Junglefowl *Gallus gallus* reported by Ali (1962) from Gangtok have not been sighted in almost last five decades. However, the Beautiful Nuthatch *Sitta formosa* a globally threatened species is still found, while the Rusty-bellied Shortwing *Brachypteryx hypertythra* was very easily netted and ringed both in Fambong Lho and Himalayan Zoological Park during the 2001 BNHS Bird-Banding Programme. The Red-breasted Hill-Partridge *Arborophila mandellii* reported by Ali (1962) from Gangtok has also not been heard or sighted recently unlike the commoner Hill Partridge *Arborophila torqueola* and Satyr Tragopan *Tragopan satyra*. The Hoary-throated Barwing *Actinodura nipalensis* (not uncommon) and the White-naped Yuhina *Yuhina bakeri* are restricted range species reported from this IBA (Anon 2002).

In this Eastern Himalaya Endemic Bird Area it is easy to find four out of nine restricted range species, at least eight out of 48 Biome 5 species, 44 out of 112 Biome 7 species, 34 out of 96 Biome 8 species and four out of 19 Biome 9 species.

Bird species include the biome-restricted Mountain Imperial Pigeon *Ducula badia*, Slaty-headed Parakeet *Psittacula himalayana*, Red-winged crested Cuckoo *Calamator coromandus*, Large Green-billed Malkoha *Phaenicophaeus tristis*, Blue-naped Pitta *Pitta nipalensis*, Orange-bellied Chloropsis *Chloropsis hardwickii*, Brown Dipper *Cinclus pallasii*, and Spotted Forktail *Enicurus maculatus*. The Nepal House Martin *Delichon nipalensis* nests under school roofs while the Common Swallow *Hirundo rustica* annually returns to nest in some shops in the heart of the traffic-riddled Gangtok town. Some birds found more commonly in the plains have recently begun to make their presence felt in Gangtok. One is the Chestnut-tailed Starling *Sturnia malabarica*, photographed in August 2007 feeding on ripe figs opposite the Sikkim Government College and in May 2011 at Tadong, the lower end of Gangtok (Ganesh Mani Pradhan and Karma Tempo on Sikkim Birds

Facebook Group 2011). Another is the House Sparrow *Passer domesticus* which was not recorded by Dr Salim Ali (1962) but which had colonized Melli in the lowlands of Sikkim around 1998, and now has colonized M.G. Road, Gangtok, taking the tally of sparrow species in Gangtok to three (including Eurasian Tree Sparrow *Passer montanus* and Russet Sparrow *Passer rutilans*). Recently, the Large-tailed Nightjar *Caprimulgus macrurus* was recorded from Rumtek area on the fringes of Fambong Lho Wildlife Sanctuary (Tashi Wangchuk Lepcha, pers. comm. 2015)

Interestingly, on 12 April 2011 a Black Stork *Ciconia nigra* was photographed above Hanumantok, Gangtok (Niraj Thapa pers. comm. 2014)

OTHER KEY FAUNA

Over 50 species of mammals have been reported from the Sanctuary. Important ones are the Chinese Pangolin *Manis pentadactyla*, Himalayan Crestless Porcupine *Hystrix brachyuran*, Yellow-throated Marten *Martes flavigula*, Masked Palm Civet *Paguma larvata*, Leopard Cat *Prionailurus bengalensis*, Asiatic Black Bear *Ursus thibetanus*, Eurasian Wild Pig *Sus scrofa*, Assamese Macaque *Macaca assamensis*, Barking Deer *Muntiacus muntjac*, Golden Jackal *Canis aureus*, Red Fox *Vulpes vulpes* and Hodgson's Flying Squirrel *Petaurista magnificus* (Anon. 2002). Red Panda *Ailurus fulgens* has become scarce in the Sanctuary which is surrounded by villages, but it has been recorded from the Ratey Chu catchment forest (S.Z. Lucksom pers. comm.) while an *ex-situ* conservation breeding programme is on in the Himalayan Zoological Park. While pugmarks of a male Tiger *Panthera tigris* (possibly strayed over from the Bhutan-West Bengal border) were recovered as plaster casts from the forests above Gangtok several years ago and confirmed by Dr Rodney Jackson of the IUCN Cat Specialist Group, who had visited Gangtok, a wild male Clouded Leopard *Neofelis nebulosa* got accidentally trapped in one of the empty enclosures in the Himalayan Zoological Park at Bulbuley.

The IBA is also rich in herpetofauna. Glass Snake/Lizard *Ophiosaurus gracilis* is not uncommon even in disturbed areas like Gangtok, as is the Mountain Pit Viper *Ovophis monticola*, Spectacled Cobra *Naja naja*, Green Rat Snake *Ptyas nigromarginata* and many others. Garden Lizard *Calotes versicolor* can now also be seen where earlier we had only the *Japalura variegata*. Himalayan Bullfrog *Nanorana liebigii* and Himalayan Toad *Duttaphrynus himalayana* are the common larger amphibians and Annandale's Bush Frog *Raorchestes annandalii* possibly the smallest, is considered to be a naturally rare species. This IBA is rich in invertebrate fauna as well.

LAND USE

- Nature conservation, research

VULNERABLE

Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>
Beautiful Nuthatch	<i>Sitta formosa</i>

ENDEMIC BIRD AREA 130: EASTERN HIMALAYAS

Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>
Hoary-throated Barwing	<i>Actinodura nipalensis</i>
White-naped Yuhina	<i>Yuhina bakeri</i>

BIOME-7: SINO-HIMALAYAN TEMPERATE FOREST

Common Hill-Partridge	<i>Arborophila torqueola</i>
Satyr Tragopan	<i>Tragopan satyra</i>
Darjeeling Pied Woodpecker	<i>Dendrocopos darjellensis</i>
Nepal House-Martin	<i>Delichon nipalensis</i>
Rufous-breasted Accentor	<i>Prunella strophia</i>
Long-tailed Thrush	<i>Zoothera dixonii</i>
White-collared Blackbird	<i>Turdus albocinctus</i>
Chestnut Thrush	<i>Turdus rubrocanus</i>
Gould's Shortwing	<i>Brachypteryx stellata</i>
Indian Blue Robin	<i>Luscinia brunnea</i>
Golden Bush-Robin	<i>Tarsiger chrysaeus</i>
White-browed Bush-robin	<i>Tarsiger indicus</i>
Rufous-breasted Bush-robin	<i>Tarsiger hyperythrus</i>
White-throated Redstart	<i>Phoenicurus schisticeps</i>
White-throated Laughingthrush	<i>Garrulax albogularis</i>
Striated Laughingthrush	<i>Garrulax striatus</i>
Black-faced Laughingthrush	<i>Garrulax affinis</i>
Slender-billed Scimitar-babbler	<i>Xiphirhynchus superciliosus</i>
Scaly-breasted Wren-babbler	<i>Pnoepyga albiventer</i>
Green Shrike-babbler	<i>Pteruthius xanthochlorus</i>
Bar-throated Siva	<i>Siva strigula</i>
Red-tailed Minla	<i>Minla ignotincta</i>
Golden-breasted Fulvetta	<i>Alcippe chrysotis</i>
Rufous Sibia	<i>Heterophasia capistrata</i>
Stripe-throated Yuhina	<i>Yuhina gularis</i>
Rufous-vented Yuhina	<i>Yuhina occipitalis</i>
Fire-tailed Myzornis	<i>Myzornis pyrrhous</i>
Brown Parrotbill	<i>Paradoxornis unicolor</i>
Chestnut-headed Tesia	<i>Tesia castaneocoronata</i>
Grey-sided Bush-warbler	<i>Cettia brunnifrons</i>
Grey-faced Leaf-warbler	<i>Phylloscopus maculipennis</i>
Ferruginous Flycatcher	<i>Muscicapa ferruginea</i>
Orange-gorgeted Flycatcher	<i>Ficedula strophia</i>
Slaty-backed Flycatcher	<i>Ficedula hodgsonii</i>
Slaty-blue Flycatcher	<i>Ficedula tricolor</i>
Sapphire Flycatcher	<i>Ficedula sapphira</i>
Rufous-bellied Niltava	<i>Niltava sundara</i>
Green-backed Tit	<i>Parus monticolus</i>
Yellow-browed Tit	<i>Sylviparus modestus</i>
White-tailed Nuthatch	<i>Sitta himalayensis</i>
Fire-tailed Sunbird	<i>Aethopyga ignicauda</i>
Yellow-breasted Greenfinch	<i>Carduelis spinoides</i>
Blanford's Rosefinch	<i>Carpodacus rubescens</i>
Dark-breasted Rosefinch	<i>Carpodacus nipalensis</i>

White-browed Rosefinch	<i>Carpodacus thura</i>
Scarlet Finch	<i>Haematospiza sipahi</i>
Brown Bullfinch	<i>Pyrrhula nipalensis</i>
Red-headed Bullfinch	<i>Pyrrhula erythrocephala</i>
Spotted-winged Grosbeak	<i>Mycerobas melanozanthos</i>

BIOME-8: SINO-HIMALAYAN SUBTROPICAL FOREST

Slaty-headed Parakeet	<i>Psittacula himalayana</i>
Blue-throated Barbet	<i>Megalaima asiatica</i>
Bay Woodpecker	<i>Blythipicus pyrrhotis</i>
Blue-naped Pitta	<i>Pitta nipalensis</i>
Black-winged Cuckooshrike	<i>Coracina melaschistos</i>
Short-billed Minivet	<i>Pericrocotus brevirostris</i>
Striated Bulbul	<i>Pycnonotus striatus</i>
Himalayan Bulbul	<i>Pycnonotus leucogenys</i>
White-throated Bulbul	<i>Alophoixus flaveolus</i>
Rufous-bellied Bulbul	<i>Hypsipetes mcclllandii</i>
Black Bulbul	<i>Hypsipetes leucocephalus</i>
Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>
Blue-capped Rock-thrush	<i>Monticola cinclorhynchus</i>
Dark-sided Thrush	<i>Zoothera marginata</i>
Tickell's Thrush	<i>Turdus unicolor</i>
Grey-winged Blackbird	<i>Turdus boulboul</i>
White-tailed Robin	<i>Myiomela leucurum</i>
Blue-fronted Robin	<i>Cinclidium frontale</i>
Slaty-backed Forktail	<i>Enicurus schistaceus</i>
Purple Cochoa	<i>Cochoa purpurea</i>
Rusty-cheeked Scimitar-Babbler	<i>Pomatorhinus erythrogenys</i>
Rufous-capped Babbler	<i>Stachyris ruficeps</i>
Red-billed Leiothrix	<i>Leiothrix lutea</i>
Himalayan Cutia	<i>Cutia nipalensis</i>
Rusty-fronted Barwing	<i>Actinodura egertoni</i>
Blue-winged Siva	<i>Siva cyanouroptera</i>
Nepal Fulvetta	<i>Alcippe nipalensis</i>
Striated Yuhina	<i>Yuhina castaniceps</i>
Black-chinned Yuhina	<i>Yuhina nigrimenta</i>
Grey-hooded Warbler	<i>Seicercus xanthoschistos</i>
White-gorgeted Flycatcher	<i>Ficedula monileger</i>
Small Niltava	<i>Niltava macgrigorae</i>
Black-throated Tit	<i>Aegithalos concinnus</i>
Yellow-cheeked Tit	<i>Parus spilonotus</i>
Black-throated Sunbird	<i>Aethopyga saturata</i>
Streaked Spiderhunter	<i>Arachnothera magna</i>
Maroon Oriole	<i>Oriolus traillii</i>
Grey Treepie	<i>Dendrocitta formosae</i>

- Tourism and recreation
- Watershed management

CONSERVATION ISSUES

- Solid waste management
- Quality or Quantity Tourism
- Increasing human-wildlife conflicts

The Sanctuary is one of the protected areas declared on

public demand. The State Forest Department received a request from the people in its surrounding villages. They were concerned about the increasing deforestation and overgrazing in their catchment area, which would affect their future.

The area was originally used intensively for cattle grazing and the soil in the Golitar area had been compacted over a large area. Ground vegetation in some areas was poor and Oak trees were lopped for fodder. Most of the old Oak trees are now gone. Large Cardamom *Amomum subulatum* plantations which had encroached on the fringes of the Sanctuary have been phased out and new livelihood initiatives like ecotourism have been taken up with the local communities. There are also dense stands of the exotic conifer *Cryptomeria japonica* planted by the Forest Department before the area was declared a wildlife sanctuary (Anon. 2002). A large campus of the G.B. Pant Institute for Himalayan Environment and Development is situated on the periphery of the Sanctuary. It can be of immense use for training and capacity building especially of local communities around this protected area. The Forest Environment and Wildlife Management Department has developed this Sanctuary as a model eco-tourism destination with camping facilities. Bird-watching is being promoted in

an effort to enhance the quality of visitation experience and make it more eco-friendly.

Eco-development Committees have been formed in villages surrounding the Sanctuary. 'Smriti Van' or Memorial Forest concept of the Department has been adopted successfully by various NGOs in a large degraded forest area adjoining the Himalayan Zoological Park at Bulbuley enhancing the forest contiguity with Ratey Chu forest. This has greatly helped the water regime, benefiting the State capital, Gangtok.

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Link

<https://www.facebook.com/groups/sikkimbirds/search/?query=chestnut-tailed%20starling>

KHANGCHENDZONGA NATIONAL PARK AND BIOSPHERE RESERVE

IN-SK-04

IBA Site Code	: IN-SK-04	Rainfall	: Not available
State	: Sikkim	Temperature	: Below zero to 30 °C
District	: North and West Sikkim	Biogeographic Zone	: Trans-Himalaya/ Himalaya
Coordinates	: 27° 37' 51" N, 88° 12' 10" E	Habitats	: Subtropical Broadleaf Hill Forest, Himalayan Moist Forest, Himalayan Dry Temperate Forest and Alpine Moist Scrub
Ownership	: State Forest Department		
Area	: 28,500 ha		
Altitude	: 1,300 msl to 8,598 msl		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 130: Eastern Himalaya), A3 (Biome 7: Sino-Himalayan Temperate Forest, Biome 8: Sino-Himalayan Subtropical Forest).

PROTECTION STATUS: Part Wildlife Sanctuary established in 1984, part ex-situ conservation area, Reserve Forest, Smriti Van, Hanumantok area under military control and private holdings.



GENERAL DESCRIPTION

Khangchendzonga National Park (KNP) is a part of Khangchendzonga Biosphere Reserve (KBR). The KNP/KBR complex situated in North and West Sikkim districts is the biggest IBA in Sikkim, occupying nearly 40% of the state. It lies entirely along the Sikkim-Nepal border and includes the Khangchendzonga Range from South Lhonak Glacier in Trans-Himalayan Sikkim down to Barsey Rhododendron Sanctuary in South Sikkim. This IBA stretches eastwards up to Tsunghang in North Sikkim with the Tista river flowing south from Tso Lhamo cold desert forming its eastern boundary for most part.

The Rathong-Rangit Valleys in the southern part of this IBA are a trekker's paradise with flora from lowland

subtropical forests to alpine meadows and snowcapped peaks and glaciers. This IBA has the world's third highest (and India's highest) peak Mt. Khangchendzonga (8598 m) and is hence the highest altitude wildlife protected area in India. Most of the core area of this IBA is permanently snowbound with a large number of peaks, while the peripheral areas including buffer zones and habitation are more important wildlife habitats.

The area is a spectacular wilderness, with snowy peaks towering above some fine forests that remain virtually undisturbed (Khacher 1980). The Park must rank as one of the most important protected areas in the entire Himalaya (Rodgers and Panwar 1988). Khangchendzonga is considered to be the finest example of an independent mountain having

its own glacial system radiating from its several summits. It also boasts of some of the most magnificent snow and ice scenery in the world (Smythe 1930).

AVIFAUNA

Some important birding habitats here are Dentam-Uttarey-Chitrey-Chewabhanjyang, Rathong Chu Valley along Yoksum-Dzongri-Goecha La trekking trail, Yambong-Singalila trail, Tashiding, Rabdentse, Dubdi, Khecheopalri all in West Sikkim; Tholung Valley-Kishong La in Dzongu, Tsungthang-Menshithang-Lachen-Thangu, Muguthang-Green Lake route including Zemu Glacier-Zemu Chu Valley, all in North Sikkim. Also included are the new eco-tourism trekking trails designated by the government of Sikkim.

Due to the size and altitude elevations in this IBA, birds recorded are from at least four biomes. Thus this IBA has at least 127 bird species of conservation concern including four globally Threatened, three Near Threatened and three restricted range species, 24 species of Biome 5, 67 of Biome 7, 26 of Biome 8 and three listed in Biome 9. Biome lists are too long to be included here. Detailed lists of different biome species are given in Lachungpa *et al.* (2008).

Birds like Lesser Kestrel *Falco naumanni* and Black-necked Crane *Grus nigricollis* have been recorded from northern Trans-Himalayan part of the IBA while Baer's Pochard *Aythya baeri* has been sighted in Lake Khecheopalri along with wintering Mergansers *Mergus merganser* and Little Grebe *Tachybaptus ruficollis* (Ganguli-Lachungpa 1991), Mallard *Anas platyrhynchos*, Common Teal *Anas crecca* and Tufted Duck *Aythya fuligula*.

Black-necked Crane *Grus nigricollis* has been recorded from Muguthang area of Lhonak Valley IBA contiguous to the north (Ganguli-Lachungpa 1998). A large loose flock of dark eagles (unidentified) was videographed during a trek to Dzongri in December 1999, flying southwards along with Himalayan Griffon *Gyps himalayensis* and Lammergeier or Bearded Vulture *Gypaetus barbatus*.

Local Lepcha people at Tholung report a unique phenomenon of congregations of either Ashy Woodpigeon *Columba pulchricollis* or Common Woodpigeon *Columba palumbus* near Tholung hot springs (a day's trek from jeepable road) in summer (Chumden Nangpa pers. comm. 2000), an annual event that has got disrupted due to development of the area for tourism.

High altitude lakes at Kishong La are important stopover sites not only for migratory waterfowl but also for resident breeding birds like Ruddy Shelduck *Tadorna ferruginea* {ducklings collected from here in 1986 survived for around five years at Gangtok's Deer Park enclosure at Tashiling Secretariat (C.B. Bhujel pers comm. 2000)}.

OTHER KEY FAUNA

Recently, Bashir (2013) conducted intensive studies

CRITICALLY ENDANGERED

Baer's Pochard *Aythya baeri*

VULNERABLE

Pallas's Fish-Eagle *Haliaeetus leucoryphus*
Black-necked Crane *Grus nigricollis*
Black-breasted Parrotbill (?) *Paradoxornis flavirostris*

NEAR THREATENED

Himalayan Griffon *Gyps himalayensis*
Satyr Tragopan *Tragopan satyra*
Yellow-rumped Honeyguide *Indicator xanthonotus*

ENDEMIC BIRD AREA-130: EASTERN HIMALAYAS

Hoary-throated Barwing *Actinodura nipalensis*
White-naped Yuhina *Yuhina bakeri*
Yellow-vented Leaf-Warbler *Phylloscopus cantator*

on carnivores in seven watersheds of Khangchendzonga Biosphere Reserve, with intensive studies in Prek-chu watershed (182 sq. km) area and found 19 species of carnivores, including 11 species of global conservation concern.

Given the size and altitudinal range of this IBA, most of the representative species of wildlife in Sikkim, barring those found on the Tibetan plateau such as Tibetan Wild Ass *Equus kiang* and some found east of the Tista river such as Takin *Budorcas taxicolor* and Gaur *Bos gaurus*, are found here. Around 19 mammals protected under Schedule-I of the Indian Wildlife (Protection) Act, 1972 including Snow Leopard *Panthera uncia*, Alpine Musk Deer *Moschus chrysogaster*, Brown Bear *Ursus arctos*, Serow *Nemorhaedus sumatraensis*, Bharal *Pseudois nayaur*, Himalayan Tahr *Hemitragus jemlahicus*, Tibetan Wolf *Canis lupus*, herpetofauna such as Indian Rock Python *Python molurus*, fresh water amphibians, beetles and butterflies, which are also protected species, are reported from this region; there could also be small populations of Himalayan Newt *Tylototriton verrucosus* in unexplored water bodies in the mid-altitudes (1300–1900 m in Darjeeling district across the Great Rangit river) but there have been no systematic surveys other than sporadic collection trips of the Zoological Survey of India in the past two decades for mammals, birds and insects.

LAND USE

- Forestry and Wildlife Management
- Military deployment
- Road maintenance
- Nature conservation and research
- Tourism/recreation/mountaineering expeditions

CONSERVATION ISSUES

- Non-biodegradable garbage along trekking / mountaineering trails
- Stray dogs around tourism and army camps

- Road construction and maintenance
- Collection of wild medicinal plants
- Spread of disease to wildlife
- Cattle grazing, poaching/snaring of wildlife
- Military deployment, ammunition depot
- Hydroelectric power projects

Threats to this IBA are similar to those in Barsey Rhododendron Sanctuary to the south, namely, shepherds' activities, firewood and fodder collection, cattle incursions from Nepal and landslides with resultant habitat degradation. In addition, there is tremendous pressure from tourism, mainly from trekkers and hikers along the trekking trails, which needs to be better regulated.

The Himalayan Mountaineering Institute, Darjeeling has been holding regular courses in the core area of the IBA at the Khangchendzonga Base Camp since its inception over four decades ago. Just this activity has been responsible for large-scale removal of Rhododendron and Junipers for fuel wood, especially for the porters. Of late, this activity is being monitored with the help of a local NGO, the Khangchendzonga Conservation Committee (KCC) based at Yoksum (Sonam Uden *pers. comm.* 2003). The KCC has also been successful in projecting the entire Rathong Chu Valley as a sacred landscape for biodiversity conservation. A hydroelectric project here was scrapped keeping these sentiments in mind.

Park infrastructure and staffing is insufficient. This was amply demonstrated when the KCC apprehended two Russian poachers in August 2001 on an illegal insect collection expedition inside the National Park (Sonam Uden *pers. comm.* 2003).

Some of the issues addressed by the Sikkim State BSAP are: coordination between the Tourism Department and the State Forest Department to check the uncontrolled flow of tourists into the western part of the IBA, garbage management, wild harvesting of medicinal plants and plants used for burning as incense, stray dogs around army and tourist campsites, damage due to graziers' camps in forests including incursions of yak herders from Nepal into the IBA (Anon. 2003). The State Forest Department has also facilitated Joint Forest Management and Ecodevelopment Committees in the villages fringing the IBA.

In the northern part of the IBA, the impact of road construction and maintenance by the labour force of the

Border Roads Organization and resultant damage to the hitherto pristine habitat, use of dynamite in these fragile Himalayan zones and resultant permanent landslide zones, encroachment, poaching of birds and other wildlife and habitat degradation are some of the issues of concern. New hydroelectric power projects are planned or underway in an effort to harness the entire potential of the Tista river valley for which some primarily academic carrying capacity exercises were conducted but without the active involvement of the forest managers of the area.

Mountaineering expeditions to Green Lake in the northern part of the IBA have left large amounts of non-biodegradable litter along the trail (Gut Lepcha *pers. comm.* 2001). This, coupled with wild harvesting of Junipers and Rhododendron, medicinal plants including the capless mushroom *Cordyceps sinensis* ('Caterpillar-fungus'), has opened up good forest areas. Veterinary staff at the Angora Rabbit breeding centre at Rabom, North Sikkim, have reported occasional instances of Goral with skin disease coming out of the forest to die in the area (Passang Bhutia *pers. comm.* 2002). It is evident that much research input is required in this IBA which, despite being the most famous wildlife protected area in Sikkim, is least known as far as its recent biodiversity status is concerned.

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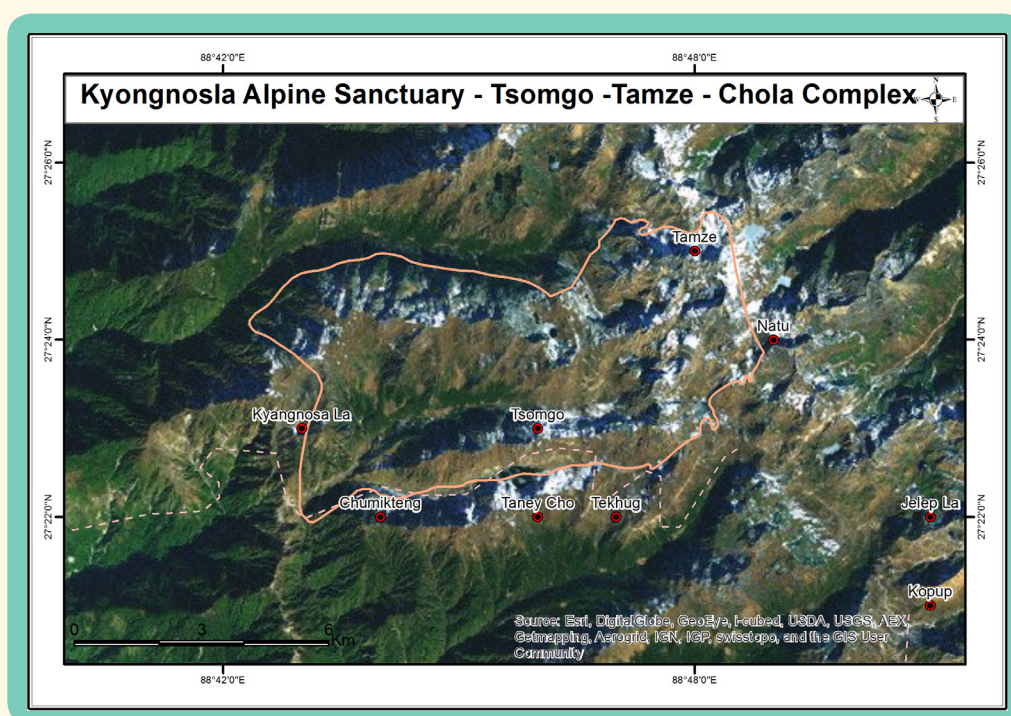
KYONGNOSLA ALPINE SANCTUARY– TSOMGO- TAMZE-CHOLA COMPLEX

IN-SK-05

IBA Site Code	: IN-SK-05	Altitude	: 375 to 2,750 msl
State	: Sikkim	Rainfall	: Not available
District	: East Sikkim	Temperature	: Not available
Coordinates	: 27° 22' 33" N, 88° 44' 13" E	Biogeographic Zone	: Himalaya
Ownership	: State Forest Department	Habitats	: Subtropical Broadleaf Hill Forest, Alpine Moist Pasture
Area	: 3,100 ha		

IBA CRITERIA: A1 (Threatened Species), A2 (Eastern Himalayas Endemic Bird Area 130), A3 (Biome-5: Eurasian High Montane; Biome-7: Sino-Himalayan Temperate Forest; Biome-8: Sino-Himalayan Subtropical Forest).

PROTECTION STATUS: Wildlife Sanctuary, established in 1992.



GENERAL DESCRIPTION

Kyongnosla and Tsomgo lie on Gangtok-Natu La highway in East Sikkim. The Sanctuary has dense bamboo thickets and typical temperate vegetation with Rhododendron-Silver Fir-Juniper forest and ground flora like Aconites, Potentilla, Aster, Iris, ground orchids and wild strawberries. There are steep cliffs that used to be snowbound throughout the year but now only in winter. There are open areas that were used by livestock in summer, until a recent ban by the government on grazing in Reserve Forest areas. This IBA is a popular tourist destination, being barely 40 km from the state capital, Gangtok.

AVIFAUNA

More than 230 species of birds have been identified here. Apart from Khangchendzonga National Park, this site is

home to the State Bird of Sikkim, Blood Pheasant *Ithaginis cruentus*, and is easily sighted.

Among the globally Threatened species of this site, the most prominent one would be the Wood Snipe *Gallinago nemoricola*, as it possibly breeds here. Himalayan Monal *Lophophorus impejanus*, considered Near Threatened (BirdLife International 2001) and Satyr Tragopan *Tragopan satyra* are also residents, the latter found in the upper limit of its range.

The Snow Pigeon *Columba leuconota* come down here in winter. Other species of interest are the Fire-tailed Sunbird *Aethopyga ignicauda* and Gold-naped Finch *Pyrrhoplectes epauletta*, birds of temperate forest. Golden Eagle *Aquila chrysaetos*, Greater Spotted Eagle *Clanga clanga*, Brown-headed Gull *Larus brunnicephalus* and Tufted Duck *Aythya fuligula* have occasionally been sighted in Tsomgo Lake during the winter Asian Waterfowl Census (AWC). Pallas's

Fish-eagle *Haliaeetus leucoryphus* was seen in the forest patch below Tamzey during a survey for Red Panda in 1998. An exhausted Eurasian Coot *Fulica atra* was rescued from Kyongnosla in March 2000 and later released (Ganguli-Lachungpa and B. Sharma 2003).

The site is located in the Eastern Himalayas Endemic Bird Area (EBA 130) where 21 species have been listed of which only one species, the Hoary-throated Barwing *Actinodura nipalensis*, has been found till now but more are likely to occur.

Perhaps the most important reason for selection of this site as an IBA is the presence of large number of biome restricted species of three biome types. Although, this site lies chiefly in Biome 7 (Sino-Himalayan Temperate Forest), birds of Biome 5 (Eurasian High Montane-Alpine and Tibetan) and Biome 8 (Sino-Himalayan Subtropical Forest) are also seen, mainly due to their altitudinal movement. In winter, birds of Biome 5 move down, so we see species such as Rosy Pipit *Anthus roseatus*, Snow Pigeon *Columba leuconota*, Alpine Accentor *Prunella collaris* and others in this site. Thirteen out of 48 species of this biome have been seen in this IBA. Expectedly, the largest number of biome restricted species is from Biome 7 with 35 out of 112 species but more are likely to be present. As the boundary between Biome 7 and Biome 8 is very diffuse (like all other biomes), some species are likely to be present in both the biomes. Due to limited surveys, only two biome restricted species of Biome 8, Grey-winged Blackbird *Turdus boulboul* and Yellow-cheeked Tit *Parus spilonotus*, have been located in this IBA. However, considering the long list of Biome 8 birds (95 species) and the extent of good habitat available, more species are likely to be found here.

VULNERABLE

Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>
Greater Spotted Eagle	<i>Clanga clanga</i>
Wood Snipe	<i>Gallinago nemoricola</i>

NEAR THREATENED

Satyr Tragopan	<i>Tragopan satyra</i>
Himalayan Griffon	<i>Gyps himalayensis</i>

ENDEMIC BIRD AREA 130: EASTERN HIMALAYA

Hoary-throated Barwing	<i>Actinodura nipalensis</i>
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BIOME 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Himalayan Griffon	<i>Gyps himalayensis</i>
Snow Partridge	<i>Lerwa lerwa</i>
Brown-headed Gull	<i>Larus brunnicephalus</i>
Snow Pigeon	<i>Columba leuconota</i>
Rosy Pipit	<i>Anthus roseatus</i>
Alpine Accentor	<i>Prunella collaris</i>
Plain-backed Thrush	<i>Zoothera mollissima</i>
Kessler's Thrush	<i>Turdus kessleri</i>
Wallcreeper	<i>Tichodroma muraria</i>
Plain Mountain-finch	<i>Leucosticte nemoricola</i>
Brandt's Mountain-finch	<i>Leucosticte brandti</i>
Yellow-billed Chough	<i>Pyrrhocorax graculus</i>
Grandala	<i>Grandala coelicolor</i>

BIOME 7: SINO-HIMALAYAN TEMPERATE FOREST

Blood Pheasant	<i>Ithaginis cruentus</i>
Satyr Tragopan	<i>Tragopan satyra</i>
Himalayan Monal	<i>Lophophorus impejanus</i>
Darjeeling Pied Woodpecker	<i>Dendrocopos darjellensis</i>
Rufous-breasted Accentor	<i>Prunella strophias</i>
White-collared Blackbird	<i>Turdus albocinctus</i>
Gould's Shortwing	<i>Brachypteryx stellata</i>
Himalayan Rubythroat	<i>Luscinia pectoralis</i>
Golden Bush-robin	<i>Tarsiger chrysaeus</i>
White-browed Bush-robin	<i>Tarsiger indicus</i>
Rufous-breasted Bush-robin	<i>Tarsiger hyperythrus</i>
White-throated Redstart	<i>Phoenicurus schisticeps</i>
White-throated Laughingthrush	<i>Garrulax albogularis</i>
Spotted Laughingthrush	<i>Garrulax ocellatus</i>
Scaly Laughingthrush	<i>Garrulax subunicolor</i>
Black-faced Laughingthrush	<i>Garrulax affinis</i>
Green Shrike-babbler	<i>Pteruthius xanthochlorus</i>
Bar-throated Minla	<i>Minla strigula</i>
Great Parrotbill	<i>Conostoma oemodum</i>
Brown Parrotbill	<i>Paradoxornis unicolor</i>
Fulvous-fronted Parrotbill	<i>Paradoxornis fulvifrons</i>
Yellow-bellied Bush-warbler	<i>Cettia acanthizoides</i>
Grey-sided Bush-warbler	<i>Cettia brunnifrons</i>
Rufous-fronted Tit	<i>Aegithalos iouschistos</i>
Rufous-vented Tit	<i>Parus rubidiventris</i>
Grey-crested Tit	<i>Lophophanes dichrous</i>
White-tailed Nuthatch	<i>Sitta himalayensis</i>
Rusty-flanked Treecreeper	<i>Certhia nipalensis</i>
Fire-tailed Sunbird	<i>Aethopyga ignicauda</i>
Tibetan Siskin	<i>Carduelis thibetana</i>
Dark-rumped Rosefinch	<i>Carpodacus edwardsii</i>
White-browed Rosefinch	<i>Carpodacus thura</i>
White-winged Grosbeak	<i>Mycerobas carnipes</i>
Gold-naped Finch	<i>Pyrrhopterus epauletta</i>
Gold-billed Magpie	<i>Urocissa flavirostris</i>

BIOME 8: SINO-HIMALAYAN SUBTROPICAL FOREST

Grey-winged Blackbird	<i>Turdus boulboul</i>
Yellow-cheeked Tit	<i>Parus spilonotus</i>

OTHER KEY FAUNA

Takin *Budorcas taxicolor*, Red or Hill Fox *Vulpes vulpes*, Himalayan Goral *Nemorhaedus goral*, Alpine Musk Deer *Moschus chrysogaster*, Red Panda *Ailurus fulgens* Yellow-Throated Marten *Martes flavigula*, Asiatic Black Bear *Ursus thibetanus*, Indian or Royle's Pika *Ochotona roylei* and Siberian Weasel *Mustela sibirica* have been recorded from this IBA. Some of the Himalayan Marmots *Marmota himalayana* rescued from North Sikkim and released in the Sanctuary were re-sighted after eight years (Ganguli-Lachungpa and Sharma 2002). So far, no herpeto-fauna survey has been conducted in this IBA.

LAND USE

- Forestry
- Military
- Nature conservation and research

CONSERVATION ISSUES

- Frequent change of army units
- Pollution of wetlands especially around defence and road maintenance areas
- Pollution due to uncontrolled tourism activities
- Heavy traffic
- Disturbance to wildlife from free-ranging stray dogs
- Infrastructure (transmission /road lines, settlements)
- Poaching

Part of the Sanctuary has faced logging operations by the Forest Department in the past. Also, much of the tree cover was removed from the area during the time when the Natu La trade route to Lhasa, Tibet was open. The areas towards Tsomgo Lake were also degraded by grazing and annual collection of medicinal herbs, but more due to uncontrolled tourism activities since the area was opened almost a decade ago. Due to deployment of non-native personnel including road maintenance labour force and army camps along the Gangtok-Natu La-Zuluk-Rongli route, there have been poaching incidences of Blood Pheasant (State Bird) and Himalayan Monal from this IBA, and often traps were encountered during surveys or feathers found outside field kitchens (Bishnu Kumar Sharma *pers. comm.* 2003).

Due to heavy human use, including vehicular traffic, both tourist and military, important wetlands, lakes and watershed areas are constantly in danger of being polluted. Almost a decade ago, an epidemic of jaundice hit the State capital Gangtok and was suspected to be a result of contami-

nation due to a military settlement at the head of the River Ratey Chu, the source of Gangtok's water supply. The area lies on the eastern periphery of this IBA. Ruddy Shelduck *Tadorna ferruginea*, Tufted Pochard *Aythya fuligula*, Eurasian Wigeon *Anas penelope* and Brown-headed Gull *Larus brunnicephalus* are now seldom seen at Tsomgo Lake due to uncontrolled numbers of tourists around its periphery and continuous traffic.

Like in other IBAs of Sikkim, stray and feral dogs are a menace, proliferating around camp kitchens. There have been instances of human casualties due to these dogs. There have also been instances of Asiatic Black Bear raiding ration depots and shops in this region. Recently the Natu La trade route between Sikkim (India) and China (Tibet) has been re-opened bringing with it the threat of wildlife trade.

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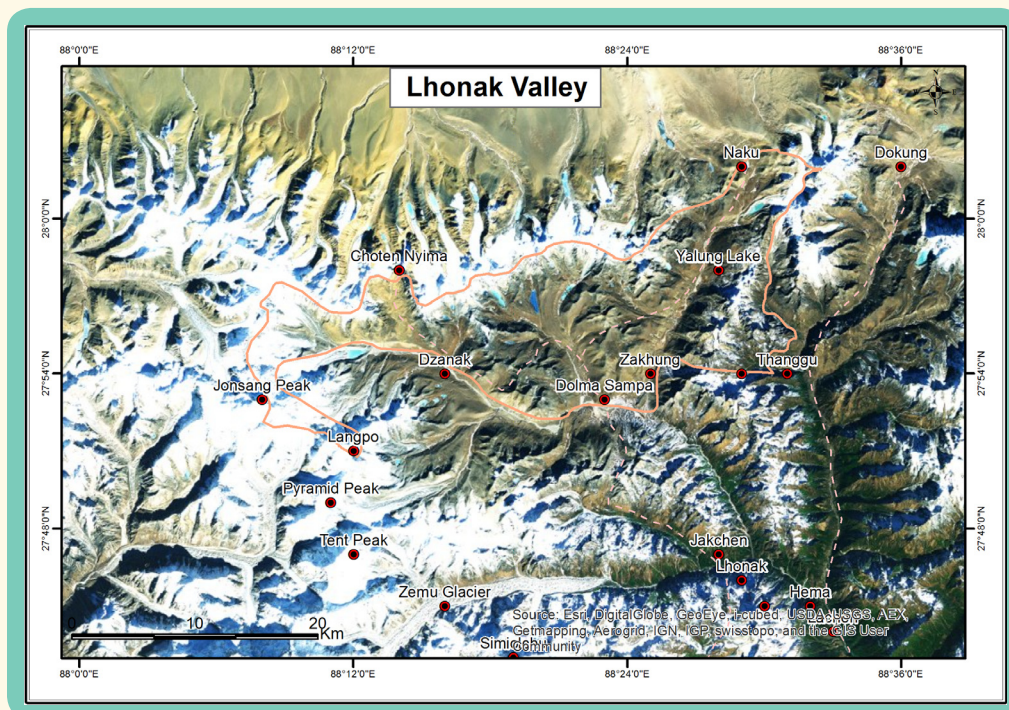
LHONAK VALLEY

IN-SK-06

IBA Site Code	: IN-SK-06	Altitude	: 4,260 to 7,459 m
State	: Sikkim	Rainfall	: Not available
District	: North Sikkim	Temperature	: -30 °C to 30 °C
Coordinates	: 27° 55' 23" N, 88° 24' 55" E	Biogeographic Zone	: Trans-Himalaya
Ownership	: State Forest Department	Habitats	: Alpine Moist Pasture, Alpine Arid Pasture
Area	: c. 5,000 ha		

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area-133: Tibetan Plateau), A3 (Biome-5: Eurasian High Montane; Biome-7: Sino-Himalayan Temperate Forest)

PROTECTION STATUS: Not officially protected



GENERAL DESCRIPTION

Lhonak Valley is Trans-Himalayan grassland in the exposed river valley of Goma Chu in northwest Sikkim, with boggy marshes, glacial lakes, barren scree slopes and glaciers. It is accessible from Thangu via the high 5,900 m pass called Lungnak La. Snowfall makes the valley inaccessible in winter. Goma Chu (chu meaning stream) originates from North and South Lhonak glaciers and runs across the valley to join Zema Chu. Zemu glacier is at the southern end of the valley, as is the Green Lake. Lhonak Valley is the only known breeding area of Black-necked Crane *Grus nigricollis* (Ganguli-Lachungpa 1998) in the Eastern Himalaya. Lakes and marshes here are used as stopover sites for migratory waterbirds (Ganguli-Lachungpa 2002) and support populations of the Sikkim Snow Toad *Scutigera* sp. Vegetation is typical cold desert, with xerophytic species such as *Ephedra gerardiana*, herbs, grasses and

sedges, aquatic weeds and many medicinal and commercially valuable plants such as *Picrorhiza kurrooa* and *Meconopsis horridula*.

AVIFAUNA

Fifty years ago itself Sálím Ali (1962) had observed that Lhonak Valley was a flyway of migratory waterfowl. This has been further proved by studies conducted by Usha Lachungpa. She has noted many migratory birds during her visits to the valley during the last 30 years.

It is the breeding site of many Vulnerable and Biome 5 restricted species such as Black-necked Crane (unsuccessful nesting attempt at Tebleh Tso, Muguthang), Tibetan Snowcock *Tetraogallus tibetanus*, Tibetan Sandgrouse *Syrrhaptes tibetanus*, White-winged Redstart *Phoenicurus erythrogastrus* and Ground Tit *Pseudopodoces humilis*. Lesser Kestrel *Falco naumanni*, earlier considered as

Vulnerable by BirdLife International (2001), has been infrequently recorded from this valley during the course of the Alpine Grassland Ecology Project of BNHS from 2000–2003.

OTHER KEY FAUNA

Mammalian fauna includes Snow Leopard *Panthera uncia*, Blue Sheep *Pseudois nayaur*, Tibetan Wolf *Canis lupus chanco*, Tibetan Fox *Vulpes vulpes*, Siberian Weasel *Mustela sibirica*, Woolly Hare *Lepus oiostolus* and Himalayan Marmot *Marmota himalayana*. Sikkim Snow Toad *Scutigera sikkimensis*, perhaps the highest altitude amphibian, is found in almost all lakes and waterbodies of Goma Chu Valley.

LAND USE

- Forest conservation
- Military deployment
- GREF or BRO
- Nature conservation and research
- Tourism/mountaineering expeditions

CONSERVATION ISSUES

- Non-biodegradable garbage
- Free-ranging stray and feral dogs
- Spread of disease to wildlife
- Collection of wild medicinal plants
- Poaching/snaring of wildlife

Overuse of Tchopta-Lungnak La-Muguthang trail and habitat by pack animals (horses, yaks) of Assam Rifles was reported during the Sikkim Biodiversity Strategy and Action Plan exercise of the State Forest Department. Besides large numbers of horses on the trail to ferry rations across the La (La = Pass), the attendant hazards of harvesting/collection of commercially valuable medicinal plants such *Picrorhiza kurroa* and *Nardostachys grandiflora* and poaching of Blue Sheep and Himalayan Marmot by the travelers have been reported (Anon. 2003)

The military has a permanent station here with many outposts, as there have been incidents of Tibetan refugees coming crossing over through the passes. As a result of past airdrops, one could see broken jerry cans and sacks of coir padding littering the landscape.

The valley is home to seven families of nomadic Tibetan graziers or Dokpas who graze yak in a rotational system governed by traditional laws. Perhaps due to sheep brought into the Valley for food for the military, a disease has killed off the entire local highland sheep population, and according to the local Animal Husbandry authorities, the disease may still persist in wild snails found in the marshes and wetlands of the region. Hence, there is every possibility of the disease spreading to the wild ungulates in this IBA.

VULNERABLE

Black-necked Crane	<i>Grus nigricollis</i>
Wood Snipe	<i>Gallinago nemoricola</i>

NEAR THREATENED

Himalayan Griffon	<i>Gyps himalayensis</i>
Giant Babax	<i>Babax waddelli</i>

ENDEMIC BIRD AREA-133: TIBETAN PLATEAU

Hoary-throated Barwing	<i>Actinodura nipalensis</i>
Broad-billed Warbler	<i>Tickellia hodgsoni</i>

BIOME- 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Himalayan Griffon	<i>Gyps himalayensis</i>
Snow Partridge	<i>Lerwa lerwa</i>
Tibetan Snowcock	<i>Tetraogallus tibetanus</i>
Tibetan Partridge	<i>Perdix hodgsoniae</i>
Ibisbill	<i>Ibidorhynchus struthersii</i>
Tibetan Sandgrouse	<i>Syrrhaptes tibetanus</i>
Snow Pigeon	<i>Columba leuconota</i>
Hume's Short-toed Lark	<i>Calandrella acutirostris</i>
Robin Accentor	<i>Prunella rubeculoides</i>
White-winged Redstart	<i>Phoenicurus erythrogaster</i>
Wallcreeper	<i>Tichodroma muraria</i>
Plain Mountain-finch	<i>Leucosticte nemoricola</i>
Brandt's Mountain-finch	<i>Leucosticte brandti</i>
Ground Tit	<i>Pseudopodoces humilis</i>
Yellow-billed Chough	<i>Pyrrhocorax graculus</i>

On finishing their duration, usually over a year or two, in this difficult region, the military personnel leave their pet dogs behind. These dogs survive by scavenging on kitchen and mess wastes. They have multiplied here over the years and have now taken to roaming in packs even on the plateau at Tso Lhamo, Lhonak and Lashar, hanging around army camps during mealtimes, preying upon wildlife and have even been seen swimming in the glacial lakes after Brahminy Shelduck chicks. Of late, they have taken to preying upon domestic livestock of the Dokpas. In order to protect the wildlife of this site, these free-roaming stray and feral dogs need to be removed without further delay.

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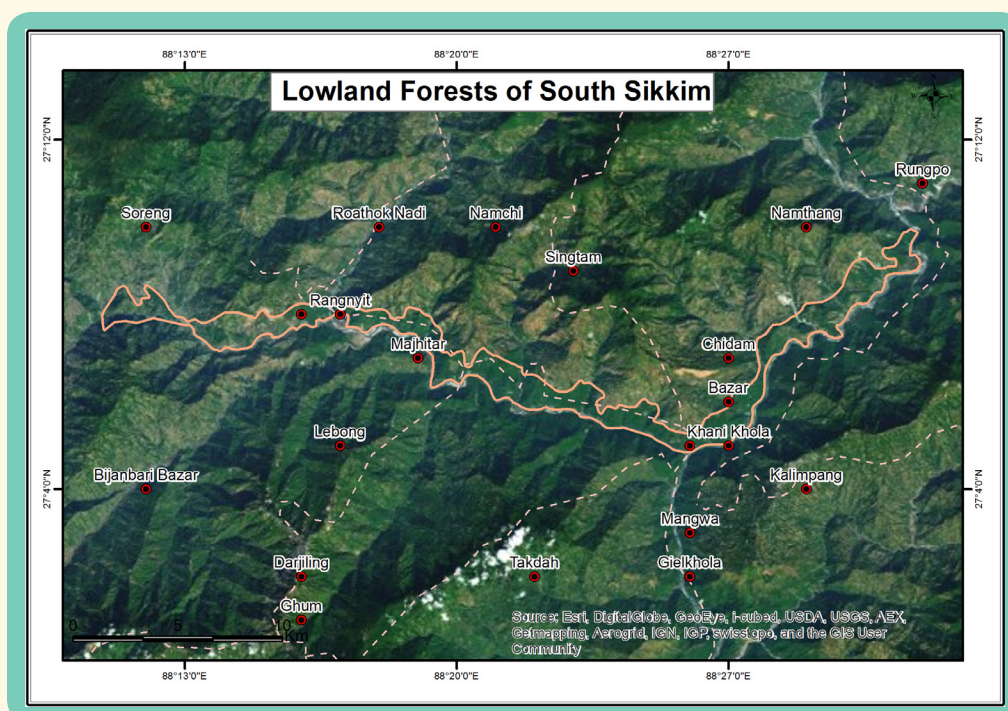
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LOWLAND FORESTS OF SOUTH SIKKIM (MELLI-BAGUWA-KITAM, JORETHANG-NAMCHI, SOMBAREY)

IBA Site Code	: IN-SK-07	Altitude	: 400 msl to 1,000 msl
State	: Sikkim	Rainfall	: Not available
District	: South and West Sikkim	Temperature	: Not Available
Coordinates	: 27° 09' 16" N, 88° 19' 48" E	Biogeographic Zone	: Himalaya
Ownership	: State Forest Department	Habitats	: Tropical Moist Deciduous Forest, Tropical Secondary Scrub
Area	: c. 2,000 ha		

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area 130: Eastern Himalayas);
A3 (Biome-9: Indo-Chinese Tropical Moist Forests)

PROTECTION STATUS: Not officially protected



GENERAL DESCRIPTION

Much of South District of Sikkim is populated with townships, villages and agriculture holdings. The lowland forests of Sikkim lie at the southern end of South District, bound to the south by the Great Rangit river, extending roughly from the foothills of the outer Himalaya to an altitude of about 1,000 m. This IBA includes the river valleys of Ramam, Rangit, Great Rangit and Tista and adjoins the Maenam-Tendong IBA to its north.

Various species of orchids, climbers, wild banana, screw-pines, nettles and giant bamboo are characteristic of this site. It is only here in Sikkim that the Rangit Valley Sal *Shorea robusta* shows a unique association with Chir Pine *Pinus roxburghii* (Bejoy Gurung and S.Z. Lucksom pers. comm. 1998). In patches of this Reserve Forest it is possible to see Sal being slowly dominated by Pine. These patches are relatively poor in bird life. However this is the only IBA with

a Bird Sanctuary (Kitam) declared as recently as 2005.

AVIFAUNA

Despite being the lowest altitude IBA in Sikkim, this site has records of birds restricted to Biomes 7, 8, and 9, as well as Biome 5, perhaps due to seasonal altitudinal migration as well as the telescoping effect of the Sikkim Himalaya where, in a distance of c. 100 km, habitats ranging from lowland, subtropical forests to high cold desert can be seen (Ali 1962). Hence, as many as 14 globally Threatened and restricted range species and at least four Biome 5 species, 15 Biome 7 species, 33 Biome 8 species and seven Biome 9 species have been recorded from this IBA.

There are old sight records of White-rumped Vulture *Gyps bengalensis* and Slender-billed Vulture *G. tenuirostris*. Both these Critically Endangered species have not been sighted during the last 10 years.

CRITICALLY ENDANGERED

White-rumped Vulture (old record)	<i>Gyps bengalensis</i>
Slender-billed Vulture (old record)	<i>Gyps tenuirostris</i>

VULNERABLE

Chestnut-breasted Hill-partridge	<i>Arborophila mandellii</i>
Rufous-necked Hornbill (?)	<i>Aceros nipalensis</i>
Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>
Slender-billed Babbler	<i>Turdoides longirostris</i>
Black-breasted Parrotbill	<i>Paradoxornis flavirostris</i>
Grey-crowned Prinia	<i>Prinia cinereocapilla</i>
Beautiful Nuthatch	<i>Sitta formosa</i>

ENDEMIC BIRD AREA 130: EASTERN HIMALAYAS

Ward's Trogon	<i>Harpactes wardii</i>
Rufous-throated Wren-babbler	<i>Spelaornis caudatus</i>
Blackish-breasted Babbler	<i>Sphenocichla humei</i>
(or Sikkim Wedge-billed Babbler)	
Yellow-vented Warbler	<i>Phylloscopus cantator</i>
White-naped Yuhina	<i>Yuhina bakeri</i>

BIOME 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Ibisbill	<i>Ibidorhyncha struthersii</i>
Grey-backed Shrike	<i>Lanius tephronotus</i>
Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>
Wallcreeper	<i>Tichodroma muraria</i>

BIOME 7: SINO-HIMALAYAN TEMPERATE FOREST

Common Hill-partridge	<i>Arborophila torqueola</i>
Darjeeling Pied Woodpecker	<i>Dendrocopos darjellensis</i>
Nepal House-martin	<i>Delichon nipalensis</i>
Chestnut-headed Tesia	<i>Oligura castaneocoronata</i>
Yellow-browed Tesia	<i>Tesia cyaniventer</i>
'Himalayan' Aberrant Bush-warbler	<i>Cettia flavolivacea</i>
Grey-faced Leaf-warbler	<i>Phylloscopus maculipennis</i>
Orange-gorgeted Flycatcher	<i>Ficedula strophia</i>
Ultramarine Flycatcher	<i>Ficedula supercilialis</i>
Slaty-blue Flycatcher	<i>Ficedula tricolor</i>
Sapphire Flycatcher	<i>Ficedula sapphira</i>
Rufous-bellied Niltava	<i>Niltava sundara</i>
Rufous-fronted Tit	<i>Aegithalos iouschistos</i>
Fire-capped Tit	<i>Cephalopyrus flammiceps</i>
Yellow-bellied Flowerpecker	<i>Pachyglossa melanoxantha</i>

The lowland forests of Sikkim are home to several species identified as Near Threatened by BirdLife International (2001): Great Pied Hornbill *Buceros bicornis* now restricted to few sightings over tea estates, Chestnut-breasted Hill-partridge *Arborophila mandelli* (not recorded recently) and Ward's Trogon *Harpactes wardi*. The Nepal Wren-babbler *Pnoepyga immaculata* could also occur here. During a survey conducted here in 1996, no potential habitat was found for the Rufous-necked Hornbill *Aceros nipalensis* in this area. However, it is likely to be found here as it is reported from adjoining forests of West Bengal.

Biome 5 species such as Ibisbill *Ibidorhyncha struthersii* are regularly recorded in winter on the banks of the Great Rangit River. Wallcreeper *Tichodroma muraria*, recorded from Trans-Himalayan Lhonak Valley (at Green Lake) and

BIOME 8: SINO-HIMALAYAN SUBTROPICAL FOREST

Rufous-throated Hill-partridge	<i>Arborophila rufogularis</i>
Black-tailed Crane	<i>Porzana bicolor</i>
Himalayan Parakeet	<i>Psittacula himalayana</i>
Hodgson's Frogmouth	<i>Batrachostomus hodgsoni</i>
Blyth's Kingfisher	<i>Alcedo hercules</i>
Golden-throated Barbet	<i>Megalaima franklinii</i>
Blue-throated Barbet	<i>Megalaima asiatica</i>
Bay Woodpecker	<i>Blythipicus pyrrhotis</i>
Blue-naped Pitta	<i>Hydrornis nipalensis</i>
Black-winged Cuckooshrike	<i>Lalage melaschistos</i>
Short-billed Minivet	<i>Pericrocotus brevirostris</i>
Striated Bulbul	<i>Pycnonotus striatus</i>
Himalayan Bulbul	<i>Pycnonotus leucogenys</i>
White-throated Bulbul	<i>Alophixus flaveolus</i>
Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>
Slaty-backed Forktail	<i>Enicurus schistaceus</i>
Grey-sided Laughingthrush	<i>Garrulax caeruleus</i>
Red-faced Liocichla	<i>Liocichla phoenicea</i>
Rusty-cheeked Scimitar-babbler	<i>Megapomatorhinus erythrogenys</i>
Indian White-hooded Babbler	<i>Gampsorhynchus rufulus</i>
Blue-winged Minla	<i>Siva cyanouroptera</i>
Rufous-backed Sibia	<i>Leioptila annectans</i>
Black-chinned Yuhina	<i>Yuhina nigrimenta</i>
Grey-headed Parrotbill	<i>Paradoxornis gularis</i>
Pale-billed Parrotbill	<i>Paradoxornis atrosuperciliaris</i>
White-breasted Parrotbill	<i>Paradoxornis ruficeps</i>
Slaty-bellied Tesia	<i>Tesia olivacea</i>
Small Niltava	<i>Niltava macgrigoriae</i>
Maroon Oriole	<i>Oriolus traillii</i>
Grey Treepie	<i>Dendrocitta formosae</i>
Collared Treepie	<i>Dendrocitta frontalis</i>

BIOME 9: INDO-CHINESE TROPICAL MOIST FOREST

Himalayan Flameback	<i>Dinopium shorii</i>
Pale-headed Woodpecker	<i>Gecinulus grantia</i>
Black-backed Forktail	<i>Enicurus immaculatus</i>
Greater Necklaced Laughingthrush	<i>Garrulax pectoralis</i>
Sultan Tit	<i>Melanochlora sultanea</i>
Crow-billed Drongo	<i>Dicrurus annectans</i>

other high altitude sites, is also recorded from this IBA. The Collared Falconet *Microhierax caerulescens* was found breeding in 1996 very close to human habitation, hawking dragonflies around the Fisheries Department pond at Baguwa, but cleverly avoiding the nets set around it by the Fisheries Department to protect the fishes from kingfishers. Ward's Trogon was sighted at Baguwa and Jorethang in October 1996 as was Striated Heron *Butorides striatus* and a juvenile falconet caught in mid-flight by a Peregrine Falcon *Falco peregrinus* (Ganguli-Lachungpa 1996). All these records make this IBA a very interesting bird watching and conservation area.

OTHER KEY FAUNA

The lowland fauna includes Golden Jackal *Canis aureus*, Leopard Cat *Prionailurus bengalensis*, Himalayan Crestless Porcupine *Hystrix brachyura*, Assamese Macaque *Macaca*

assamensis, Barking Deer *Muntiacus muntjak*, Tree Shrew *Tupaia belangeri*, squirrels, fruit bats, a host of butterflies and other invertebrates, riverine fish (over 40 species), Indian Rock Python *Python molurus*, geckos, freshwater frogs and toads and perhaps even Himalayan Newt *Tylototriton verrucosus*.

LAND USE

- Agriculture
- Forestry
- Nature conservation and research
- Watershed management
- Urban / Industrial / Transport

CONSERVATION ISSUES

- Forest fires
- Disturbance to birds
- Spread of weeds and exotic snails
- Urbanisation and its effect

A representative portion of lowland forests of Sikkim was only recently included in the Protected Area Network of the state with the declaration of the 6 sq. km Kitam Bird Sanctuary in 2005.

Population-wise, South District of Sikkim is second largest after East District. There are 144 inhabited revenue blocks. This area has been experiencing frequent occurrences of forest fire and was selected as a case study for watershed analysis (Sandeep Tambe *pers. comm.* 2003).

Habitat loss and fragmentation: The original forest as seen on the Survey of India map of more than 20 years ago all along the course of the rivers Tista and Great Rangit, is today a very narrow forest belt fragmented for most part. Lowland forested areas between Jorethang and Melli comprise reserve forests of Majhitar, Kitam and Melli-Ralu-Sumbuk. A metalled road now runs right through, carrying heavy vehicular traffic. The major townships of Jorethang, Melli and Rangpo are situated along this route. The area has also been set aside as industrial development zone with a range of establishments from a small glass factory to the beer factories, LPG bottling plant and Manipal University complex. New hydroelectric projects have also been taken up in this zone.

Timber poaching from across the state border was reported by local people as the principal cause of lack of old large trees especially Teak *Tectona grandis*. In-depth study and

long term monitoring of the lowland forests, especially the vanishing Sal forest belt of Sikkim is urgently required.

Livestock grazing: Cattle were grazed in almost all forest areas till a ban on grazing in reserve forests was instituted in 2002. Spread of weeds like Lantana, Mikania and Eupatorium is noticeable in many areas. In recent years, the spread of an accidentally introduced exotic species of snail has been reported to be causing crop damage. Assamese Macaques *Macaca assamensis* and Wild Boar *Sus scrofa* and occasionally porcupines are also reported to raid crop fields in villages surrounding forest patches. Use of biocides in agriculture is being phased out by the state government in an effort to become an 'organic state'.

People reported dynamiting and poisoning of water for fish all along Ramam Khola and at Manpur below Kitam. Forest fires are almost annually reported from this IBA.

In addition to the above-mentioned biotic pressures, Kitam forest also shows the succession of the natural Sal *Shorea robusta* stands by Chir Pine *Pinus roxburghi* which is fire resistant. There was a clear shortage of bird life in the Pine stands as compared to Sal patches though the exact quantification has not been done. Since this IBA is used more like a thoroughfare even by bird watchers passing through to more popular birding, trekking or tourism destinations in the higher altitudes, there is a real lack of ecological information from this zone. Sightings of Kaleej Pheasant very close to human habitation or along the Melli-Jorethang road are no longer common (Ganguli-Lachungpa 1996). Indian Peafowl in Kitam introduced from Punjab over three decades ago by the State Forest Department (Sona Tshering Bhutia *pers. comm.* 2003) seem to be thriving and villagers, so much so that sometimes complain of crop depredation by peafowl are reported. Surveys to ascertain the presence of Himalayan Newt *Tylototriton verrucosus* and assess the genetic purity of Red Junglefowl *Gallus gallus* need to be undertaken in this IBA which has the only bird sanctuary in the state.

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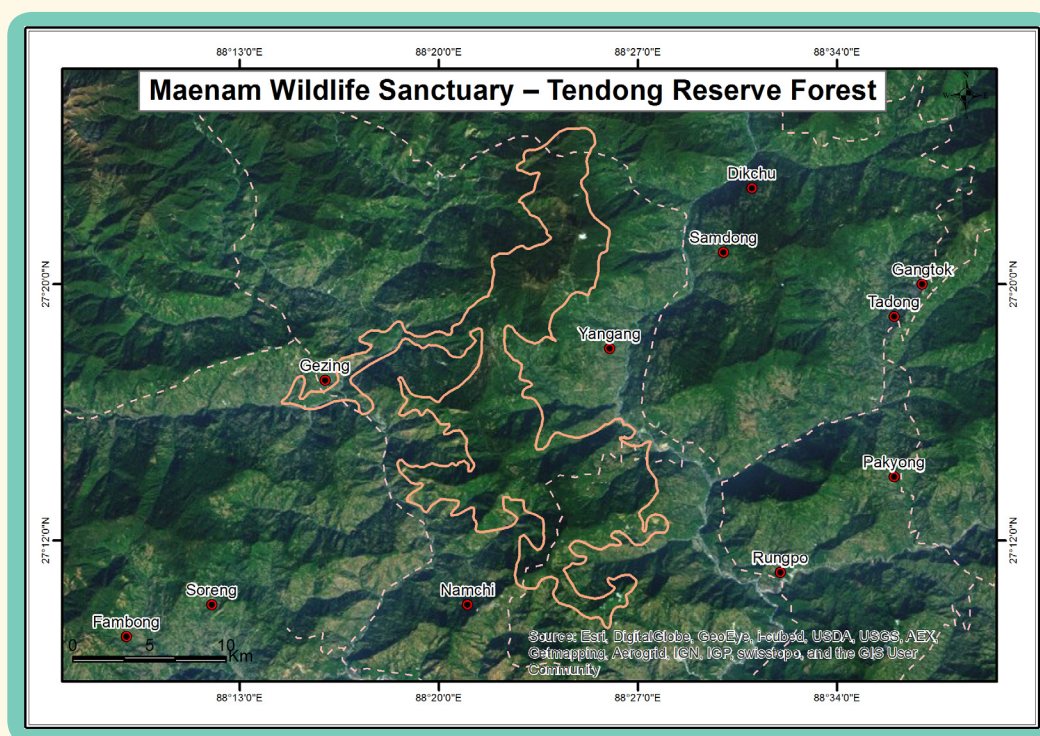
MAENAM WILDLIFE SANCTUARY-TENDONG RF

IN-SK-08

IBA Site Code	: IN-SK-08	Altitude	: 2,100 to 3,300 m
State	: Sikkim	Rainfall	: Not available
District	: South Sikkim	Temperature	: Not Available
Coordinates	: 27° 18' 50" N, 88° 23' 35" E	Biogeographic Zone	: Himalaya
Ownership	: State Forest Department	Habitats	: Subtropical Dry Evergreen Forest, Subtropical Broadleaf Hill Forest
Area	: 3,539 ha		

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area-130: Eastern Himalayas); A3 (Biome-7: Sino-Himalayan Temperate Forest, Biome-8: Sino-Himalayan Subtropical Forest).

PROTECTION STATUS: Wildlife Sanctuary, established in 1987 and Tendong Reserve Forest, not officially protected.



GENERAL DESCRIPTION

Maenam Wildlife Sanctuary is located on the Maenam-Tendong ridge which runs north-south bisecting Sikkim longitudinally, and is drained by the Teesta river to the East and the Rangit river in the West. The altitudinal gradient from 2,100 msl to 3,300 msl provides for a range of microclimates and floral diversity from subtropical forests to stabilised scree slopes. These diverse forest types in turn shelter a wide range of faunal elements. The Sanctuary has tremendous watershed value, being the only source of perennial water on this ridge. The bustling township of Namchi, headquarters of the South District, situated 30 km south, totally depends on water piped from the Burmelly stream originating from within the Sanctuary, while the adjoining town of Ravangla also depends on the Sanctuary for potable water.

“Maenam-la” means “Treasury of Medicines”, as the region is rich in medicinal plants. There is an old Buddhist monastery, Maenam Gompa, at the top of the ridge. Interestingly, despite the disturbance from nearby urban areas, Maenam harbours rich bird diversity (Anon. 2001).

The entire stretch of forest along Temi-Tarku-Damthang-Tendong-Bhanjyang-Ravangla-Maenam, and further north linking with Karjee-Labdag forests of the Khangchendzonga Biosphere Reserve is virtually contiguous, lined in a few places by the exotic *Cryptomeria japonica* trees. Tea plantations of the state government occupy a part of Temi.

AVIFAUNA

There are several villages fringing this IBA due to which the habitat is open in several places. This open habitat coupled with patches of dense forest provides ideal bird

habitats in this IBA. Noteworthy species such as Hodgson's Frogmouth *Batrachostomus hodgsoni* was observed in Pa-bong area (Ganguli-Lachungpa and Lucksom 1998).

The site lies in the Eastern Himalaya Endemic Bird Area (EBA 130), in which Stattersfield *et al.* (1998) have listed 21 restricted range species. At least five of them have been recorded here. This mid-altitude IBA falls mainly in Sino-Himalayan Temperate Forest (Biome 7). BirdLife International (undated) has listed 112 species in this biome, of which 53 are found here. The higher reaches of this IBA, above 3,000 msl, show some birds of Biome 5 (Eurasian High Montane – Alpine and Tibetan) where 48 species are listed. Seven are seen in this site. At lower reaches, Biome 7 merges with Biome 8 (Sino-Himalayan Subtropical Forest) where 95 species are listed. Almost half of them (42 species) have been found here. Some areas of this IBA, especially in the valleys, also show some faunal elements of Biome 9 (Indo-Chinese Tropical Moist Forest). Four species of this biome are found here. They are Grey Peacock-pheasant *Polyplectron bicalcaratum* (unconfirmed), Pale-headed Woodpecker *Gecinulus grantia*, Greater Necklaced Laughingthrush *Garrulax pectoralis* and Sultan Tit *Melanochlora sultanea*. The list of other biome species is too long to be mentioned here.

This IBA has habitat contiguity with Khangchendzonga Biosphere Reserve, and therefore, both these IBAs together form a large habitat for the bird life of this small state. The site fulfils three IBA criteria: A1 (Threatened species), A2 (EBA 130: Eastern Himalaya) and A3 (Biome-restricted species).

OTHER KEY FAUNA

This IBA has mammals like Red Panda *Ailurus fulgens*, Leopard *Panthera pardus*, Asiatic Black Bear *Ursus thibetanus*, Serow *Nemorhaedus sumatraensis*, Goral *Nemorhaedus goral*, Barking Deer *Muntiacus muntjak*, Inidan or Royle's Pika *Ochotona roylei*, Particoloured Flying Squirrel *Hylopetes alboniger*, Hoary-bellied Himalayan Squirrel *Callosciurus pygerythrus*, Orange-bellied Himalayan Squirrel *Dremomys lokriah*, Yellow-throated Marten *Martes flavigula*, Assamese Macaque *Macaca assamensis*, Wild Boar *Sus scrofa* and Himalayan Crestless Porcupine *Hystrix brachyura* and representative herpetofauna and invertebrates.

LAND USE

- Nature conservation, research
- Tourism and recreation
- Watershed management

CONSERVATION ISSUES

- Disturbance to birds
- Recreation and tourism
- Erosion
- Illegal felling of trees
- Poaching

VULNERABLE

Greater Spotted Eagle	<i>Clanga clanga</i>
Chestnut-breasted Hill-partridge	<i>Arborophila mandellii</i>
Rufous-necked Hornbill	<i>Aceros nipalensis</i>
Rusty-bellied Shortwing	<i>Brachypteryx hyperythra</i>

ENDEMIC BIRD AREA-130: EASTERN HIMALAYAS

Rufous-throated Wren-babbler	<i>Spelaeornis caudatus</i>
Blackish-breasted Babbler	<i>Sphenocichla humei</i>
Hoary-throated Barwing	<i>Actinodura nipalensis</i>
White-naped Yuhina	<i>Yuhina bakeri</i>
Broad-billed Warbler	<i>Tickellia hodgsoni</i>

A collaborative biodiversity survey was carried out by World Pheasant Association (WPA)-India and the State Forest Department in 1996 (Ahmed and Ganguli-Lachungpa 1996), prior to which Dipankar Ghosh of WWF-India carried out a short study on Satyr Tragopan through WPA. The Sanctuary and surrounding villages were also covered during the National Biodiversity Strategy and Action Plan (NBSAP), a project of the Ministry of Environment, Forests and Climate Change. In addition, formation of Eco-development Committees and 'Pani' (Water) Panchayats in villages around Maenam WLS was also facilitated by the Forest Department of Sikkim (Sandeep Tambe *pers. comm.* 2003). In 2002, the State Government declared a State Biodiversity Park at Damthang, Tendong comprising 250 ha (S.B.S. Bhadauria *pers. comm.* 2003). Erosion, landslides and landslips, snow, weeds, wind, poaching, destruction of habitat due to illegal felling and collection of non-timber forest fruits (food of the Asiatic Black Bear, Barking Deer and monkeys) and encroachment in the form of cardamom cultivations are some of the issues affecting the Sanctuary (Anon. 2001).

Uncontrolled tourism causes damage to vegetation and change in the behavioral pattern of wild animals in general. Recreational tourism within the Sanctuary is picking up and the magnificent mountain views are a great attraction for tourists. Religious pilgrimages to Bhale-Dhunga and the Buddhist monastery are quite popular among the local community. Problems of garbage and noise pollution, vandalism and other tourism-generated pressures need to be addressed.

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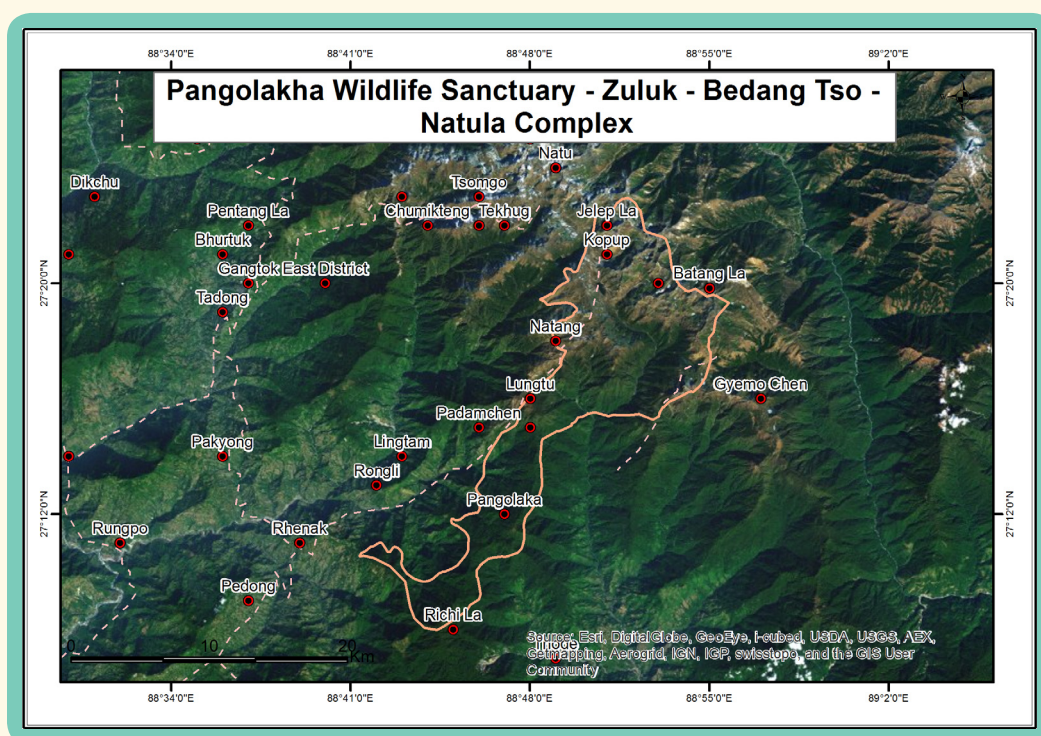
PANGOLAKHA WILDLIFE SANCTUARY–ZULUK- BEDANG TSO – NATU LA COMPLEX

IN-SK-09

IBA Site Code	: IN-SK-09	Altitude	: 1,300 - >4,000 m
State	: Sikkim	Rainfall	: Not available
District	: East Sikkim	Temperature	: Not Available
Coordinates	: 27° 20' 28" N, 88° 46' 42" E	Biogeographic Zone	: Himalaya
Ownership	: State Forest Department	Habitats	: Subtropical Pine Forest, Subtropical Broadleaf Hill Forest, Alpine Moist Pasture
Area	: 12,400 ha		

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area 130: Eastern Himalayas; Endemic Bird Area 133: Southern Tibet), A3 (Biome-5: Eurasian High Montane, Biome-7: Sino-Himalayan Temperate Forest; Biome-8: Sino-Himalayan Subtropical Forest).

PROTECTION STATUS: Wildlife Sanctuary, established in 2002.



GENERAL DESCRIPTION

The Pangolakha Range, extending along the Chola Range, separates Sikkim from Bhutan. Hathichirey (the place where elephants can move) lies at the southern end of the Sanctuary. Jimoche Peak forms the tri-junction between Bhutan, Sikkim and West Bengal, where further down, the forest continues as the Neora Valley National Park (an IBA in West Bengal). The Sanctuary has typical alpine-temperate-subtropical vegetation with high altitude lakes around Jelep La. Rhododendron, Silver Fir, Juniper forest and associated ground flora and moss-filled oak forests with dense bamboo thickets form ideal habitat for the Red Panda *Ailurus fulgens*, the State Animal of Sikkim.

AVIFAUNA

The mountain passes of Natu La and Jelep La (La = Pass) form the routes for migratory waterbirds many of which stop over at the various wetlands in the area, especially Bedang Tso Lake. The Himalayan Monal *Lophophorus impejanus* (locally called as Feydong) used to be found here (Chezung Lachungpa *pers. comm.* 1996), hence the name Bedang Tso. Sometimes there is mass migration of birds of prey such as Red Kites *Milvus milvus* and unidentified eagles. Ruddy Shelduck *Tadorna ferruginea* used to breed in Sherathang marshes.

Wood Snipe *Gallinago nemoricola*, a globally Threatened species (BirdLife International 2001) is occasionally seen on the banks of the Bedang Tso. Eurasian Woodcock *Scolopax*

rusticola is also seen. Hill Pigeons *Columba rupestris* roost on smoking chimneys of local houses in snowy winters at Kupup and Gnathang. The Snow Pigeon *Columba leuconota*, Snow Partridge *Lerwa lerwa*, Himalayan Monal *Lophophorus impejanus* and Gold-naped Finch *Pyrrhoptes epauletta* are common on the alpine slopes. The Pallas's Fish-eagle *Haliaeetus leucoryphus* was once seen in the forest patch over the Pangolakha Range in 1994. Large Cormorant *Phalacrocorax carbo* and Bar-headed Geese *Anser indicus* were sighted at Bedang Tso in 1992 and 2003.

VULNERABLE

Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>
Greater Spotted Eagle	<i>Clanga clanga</i>
Chestnut-breasted Hill-partridge	<i>Arborophila mandellii</i>
Wood Snipe	<i>Gallinago nemoricola</i>
Rufous-necked Hornbill	<i>Aceros nipalensis</i>
Slender-billed Babbler	<i>Turdoides longirostris</i>
Black-breasted Parrotbill	<i>Paradoxornis flavirostris</i>
Grey-crowned Prinia	<i>Prinia cinereocapilla</i>

NEAR THREATENED

Ward's Trogon	<i>Harpactes wardi</i>
Giant Babax	<i>Babax waddelli</i>

ENDEMIC BIRD AREA 130: EASTERN HIMALAYAS

Ward's Trogon	<i>Harpactes wardi</i>
Hoary-throated Barwing	<i>Actinodura nipalensis</i>
Broad-billed Warbler	<i>Tickellia hodgsoni</i>

BIOME 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Himalayan Griffon	<i>Gyps himalayensis</i>
Snow Partridge	<i>Lerwa lerwa</i>
Solitary Snipe	<i>Gallinago solitaria</i>
Rosy Pipit	<i>Anthus roseatus</i>
Alpine Accentor	<i>Prunella collaris</i>
Altai Accentor	<i>Prunella himalayana</i>
Grandala	<i>Grandala coelicolor</i>
Plain Mountain-finch	<i>Leucosticte nemoricola</i>
Red-fronted Rosefinch	<i>Carpodacus puniceus</i>
Rufous-necked Snowfinch	<i>Pyrgilauda ruficollis</i>
Plain-backed Snowfinch	<i>Pyrgilauda blanfordi</i>

BIOME 7: SINO-HIMALAYAN TEMPERATE FOREST

Common Hill-partridge	<i>Arborophila torqueola</i>
Rufous-breasted Accentor	<i>Prunella strophilata</i>
Gould's Shortwing	<i>Heteroxenicus stellata</i>
Himalayan Rubythroat	<i>Calliope pectoralis</i>
Fire-tailed Myzornis	<i>Myzornis pyrrhoura</i>
Great Parrotbill	<i>Conostoma oemodium</i>
'Himalayan' Aberrant Bush-warbler	<i>Cettia flavolivacea</i>
Grey-sided Bush-warbler	<i>Cettia brunnifrons</i>
Rufous-vented Tit	<i>Parus rubidiventris</i>
Blanford's Rosefinch	<i>Carpodacus rubescens</i>
Dark-breasted Rosefinch	<i>Procarduelis nipalensis</i>
'Himalayan' White-browed Rosefinch	<i>Carpodacus thura</i>
White-winged Grosbeak	<i>Mycerobas carnipes</i>
Gold-naped Finch	<i>Pyrrhoptes epauletta</i>
Blue-throated Barbet	<i>Megalaima asiatica</i>

The Tibetan Eared-pheasant *Crossoptilon harmani*, a Near Threatened species, has been reported from Kupup (near Bedang Tso) below the Jelep La. This area falls under Pangolakha Wildlife Sanctuary and is adjacent to the Chumbi Valley of Tibet. This pheasant is one of the two endemic birds in Southern Tibet (EBA-133). It is reported from the edge of mixed Broadleaf Coniferous forest; Rhododendron, Juniper and deciduous scrub and grassland (Stattersfield *et al.* 1998). Another Near Threatened species found in this IBA is the Giant Babax *Babax waddelli*.

Due to great altitudinal variation from 1,300 msl to above 4,000 msl, three biomes occur in this IBA: Biome 5: Eurasian High Montane (Alpine and Tibetan), from above 3,600 m; Biome 7: Sino-Himalayan Temperate Forest, between 1,800 m and 3,600 m; and, Biome 8: Sino-Himalayan Subtropical Forest, occurring between c. 1,000 m to 2,000 m (BirdLife International, undated). In Biome 5, 48 species are found, out of which 11 are found at this site. Similarly, 112 species are representative of Biome 7 and on this site are found 14 species. At lower altitude, in Biome 8, only two species out of 95 are reported from this IBA. It is likely that with more detailed surveys, more biome restricted species would be found.

OTHER KEY FAUNA

Fauna includes Tiger *Panthera tigris*, Snow Leopard *Panthera uncia*, Leopard *Panthera pardus*, Takin *Budorcas taxicolor*, Gaur *Bos gaurus*, Red Fox *Vulpes vulpes*, Hill Fox *V. montana*, Goral *Nemorhaedus goral*, Serow *N. sumatraensis*, Musk Deer *Moschus chrysogaster*, Yellow-Throated Marten *Martes flavigula*, Asiatic Black Bear *Ursus thibetanus*, Red Panda *Ailurus fulgens*, Royle's Pika *Ochotona roylei* and Himalayan Weasel *Mustela sibirica*. There are chances of occurrence of Himalayan Salamander *Tylotriton verrucosus* in addition to other herpetofauna at lower altitude where waterbodies are home to several hill stream fish while in the upper reaches, the exotic Brown Trout has been introduced in the alpine lakes.

LAND USE

- Forestry
- Military
- Nature conservation and research
- Water /Watershed Management

CONSERVATION ISSUES

- Frequent / regular change of army units
- Pollution of wetlands especially around defence and BRO settlements
- Heavy military traffic via Zuluk
- Disturbance to wildlife from stray and feral dogs
- Grazing in forests

As the area is at a high altitude bordering Tibet, it

is manned by the Indian Army who occupy the area permanently. Any biodiversity sensitisation programme is hence short-lived as the officers keep on changing. Most camps are around or near water bodies which increase pollution, especially through non-biodegradable garbage, and contribute to the increase in stray dogs. In addition to preying on wildlife such as Brahminy Shelduck *Tadorna ferruginea*, the dogs have also caused human casualties, as reported by the residents.

The forest here is used by some yak graziers and is the route that the Tiger and Takin have followed into Sikkim (Ganguli-Lachungpa 1998, 2000). There are sporadic incidents of Tiger attacking small herds of domestic yaks near Gnathang. Around cantonments along the Gangtok-Natu La-Zuluk-Rongli route, there have been cases of poaching of wildlife (Bishnu Kumar Sharma *pers. comm.* 2000).

The State Forest Department has set up Eco-Development Committees (EDCs) around all wildlife protected areas. In

this IBA an EDC has been set up in the village of Gnathang. The conservation issues have also been addressed in the National Biodiversity Strategy and Action Plan process for the Sikkim State.

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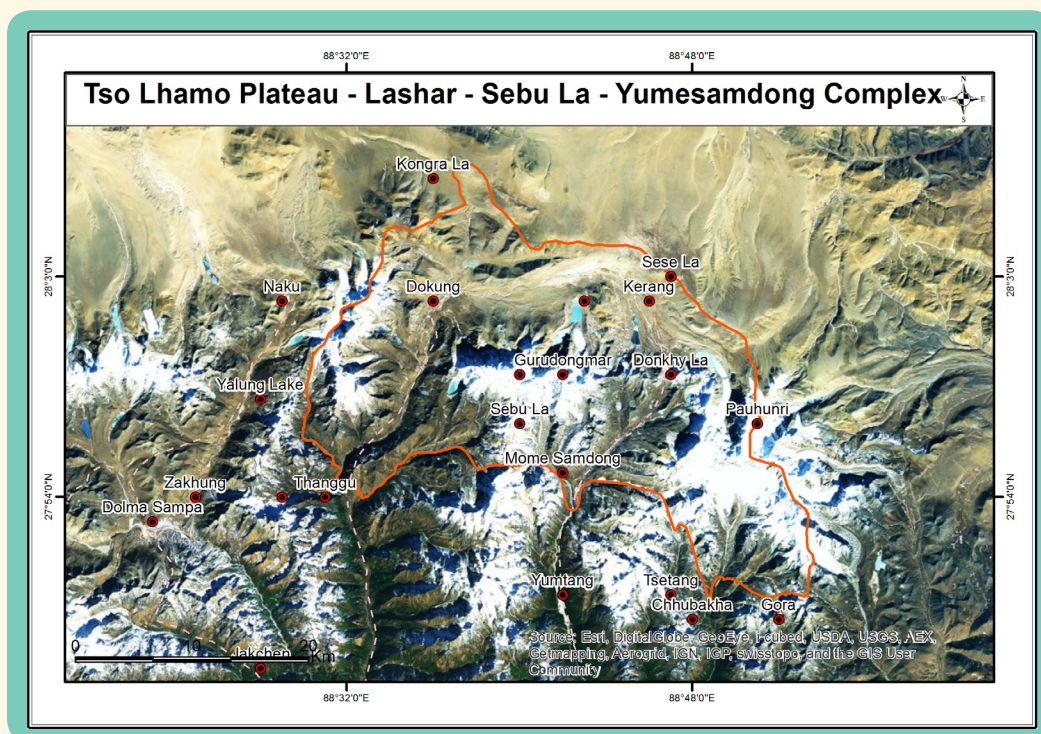
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TSO LHAMO PLATEAU-LASHAR-SEBU LA-YUMESAMDONG COMPLEX

IBA Site Code	: IN-SK-10	Altitude	: 4,500 msl to 7,000 msl
State	: Sikkim	Rainfall	: Not available
District	: North Sikkim	Temperature	: -20 °C to 25 °C
Coordinates	: 28° 01' 43" N, 88° 45' 17" E	Biogeographic Zone	: Trans-Himalaya
Ownership	: State Forest Department	Habitats	: Alpine Arid Pasture and Alpine Dry Scrub
Area	: c.50,000 ha		

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area 130: Eastern Himalayas; Endemic Bird Area 133: Tibetan Plateau); A3 (Biome-5: Eurasian High Montane; Biome-7: Sino-Himalayan Temperate Forest).

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

The region comprising Tso Lhamo Plateau, Lashar, Sebu La and Yumesamdong complex is a typical cold desert on Tibetan Plateau and Trans-Himalayan facies, with high snow mountains and glaciers, lakes and geothermal springs and vast valleys with grasses, sedges, cushionoid vegetation, lichens and associated fauna. In this Reserve Forest on the international border with Tibet (China), heavy military deployment has caused a network of roads on the plateau with military establishment mostly near glacial lakes of Gyam Tsona and Tso Lhamo. The area has a short growing season from May to October with peak in July–August when most of the birds breed. This eco-region has not yet been included in the protected area network of the state and is perhaps the most threatened as it contains many Threatened species protected under Schedule I and

Schedule II of the Indian Wildlife (Protection) Act 1972. Some of them are Tibetan Wild Ass or Kiang *Equus kiang*, Argali or Nayan *Ovis ammon*, Tibetan Gazelle *Procapra picticaudata*, Snow Leopard *Panthera uncia* and Black-necked Crane *Grus nigricollis*.

This IBA seeks to link the Tso Lhamo Plateau with the Lashar, Sebu La Yumesamdong section, reaching southwards to touch the Sino-Himalayan Temperate Forests below Yumesamdong and around Thangu in North Sikkim.

AVIFAUNA

A total of around 227 birds have been recorded from this c. 500 sq. km area, including four globally Threatened species, three restricted range species and 93 biome-restricted species (Ganguli-Lachungpa and Rahmani 2003).

One of these, Giant Babax *Babax waddelli*, is reported only from extreme northeast Sikkim from 2,700–4,400 m in the Tibetan Plateau facies (EBA 133) in *Hippophae* thickets. It is reported in dense deciduous scrub above tree-line and edge of coniferous forest (Stattersfield *et al.* 1998) as 'locally common' (Ali and Ripley 1987).

This site in the Eastern Himalayas Endemic Bird Area is the highest altitude eco-region in Sikkim spanning two biomes, Biome 7 (Sino-Himalayan Temperate Forest) and

VULNERABLE

Greater Spotted Eagle	<i>Clanga clanga</i>
Black-necked Crane	<i>Grus nigricollis</i>
Wood Snipe	<i>Gallinago nemoricola</i>

NEAR THREATENED

Giant Babax	<i>Babax waddelli</i>
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ENDEMIC BIRD AREA 130: EASTERN HIMALAYAS

Hoary-throated Barwing	<i>Actinodura nipalensis</i>
Broad-billed Warbler	<i>Tickellia hodgsoni</i>
Giant Babax	<i>Babax waddelli</i>

BIOME 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Himalayan Griffon	<i>Gyps himalayensis</i>
Snow Partridge	<i>Lerwa lerwa</i>
Tibetan Snowcock	<i>Tetraogallus tibetanus</i>
Tibetan Partridge	<i>Perdix hodgsoniae</i>
Blood Pheasant	<i>Ithaginis cruentus</i>
Solitary Snipe	<i>Gallinago solitaria</i>
Ibisbill	<i>Ibidorhyncha struthersii</i>
Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i>
Tibetan Sandgrouse	<i>Syrrhaptes tibetanus</i>
Snow Pigeon	<i>Columba leuconota</i>
Tibetan Lark	<i>Melanocorypha maxima</i>
Hume's Short-toed Lark	<i>Calandrella acutirostris</i>
Rosy Pipit	<i>Anthus roseatus</i>
Grey-backed Shrike	<i>Lanius tephronotus</i>
Alpine Accentor	<i>Prunella collaris</i>
Altai Accentor	<i>Prunella himalayana</i>
Robin Accentor	<i>Prunella rubeculoides</i>
Brown Accentor	<i>Prunella fulvescens</i>
Plain-backed Thrush	<i>Zoothera mollissima</i>
White-winged Redstart	<i>Phoenicurus erythrogaster</i>
Grandala	<i>Grandala coelicolor</i>
Smoky Leaf-warbler	<i>Phylloscopus fuligiventer</i>
Tickell's leaf-warbler	<i>Phylloscopus affinis</i>
Wallcreeper	<i>Tichodroma muraria</i>
Hodgson's Mountain-finch	<i>Leucosticte nemoricola</i>
Brandt's Mountain-finch	<i>Leucosticte brandti</i>
Himalayan Beautiful Rosefinch	<i>Carpodacus pulcherrimus</i>
Streaked Great Rosefinch	<i>Carpodacus rubicilloides</i>
Red-fronted Rosefinch	<i>Carpodacus puniceus</i>
Black-winged Snowfinch	<i>Montifringilla adamsi</i>
White-rumped Snowfinch	<i>Onychostreuthus taczanowskii</i>
Rufous-necked Snowfinch	<i>Pyrgilauda ruficollis</i>
Plain-backed Snowfinch	<i>Pyrgilauda blanfordi</i>
Ground Tit	<i>Pseudopodoces humilis</i>
Yellow-billed Chough	<i>Pyrrhocorax graculus</i>

BIOME 7: SINO-HIMALAYAN TEMPERATE FOREST

Himalayan Monal	<i>Lophophorus impejanus</i>
Speckled Woodpigeon	<i>Columba hodgsonii</i>
Darjeeling Pied Woodpecker	<i>Dendrocopos darjellensis</i>
Nepal House-martin	<i>Delichon nipalensis</i>
Rufous-breasted Accentor	<i>Prunella strophilata</i>
White-collared Blackbird	<i>Turdus albocinctus</i>
Golden Bush-robin	<i>Tarsiger chrysaeus</i>
White-throated Redstart	<i>Phoenicurus schisticeps</i>
Black-faced Laughingthrush	<i>Trochalopteron affine</i>
Stripe-throated Yuhina	<i>Yuhina gularis</i>
Rufous-vented Yuhina	<i>Yuhina occipitalis</i>
Grey-sided Bush-warbler	<i>Oligura brunneifrons</i>
Orange-barred Leaf-warbler	<i>Phylloscopus pulcher</i>
Grey-faced Leaf-warbler	<i>Phylloscopus maculipennis</i>
Large-billed Leaf-warbler	<i>Phylloscopus magnirostris</i>
Slaty-blue Flycatcher	<i>Ficedula tricolor</i>
Rufous-vented Tit	<i>Parus rubidiventris</i>
Grey-crested Tit	<i>Parus dichrous</i>
Fire-tailed Sunbird	<i>Aethopyga ignicauda</i>
Dark-rumped Rosefinch	<i>Carpodacus edwardsii</i>
Himalayan White-browed Rosefinch	<i>Carpodacus thura</i>
Brown Bullfinch	<i>Pyrrhula nipalensis</i>
Red-headed Bullfinch	<i>Pyrrhula erythrocephala</i>
Collared Grosbeak	<i>Mycerobas affinis</i>
White-winged Grosbeak	<i>Mycerobas carnipes</i>

Biome 5 (Eurasian High Montane, Alpine and Tibetan), as described by BirdLife International (undated).

Of the 48 Biome 5 (Eurasian High Montane, Alpine and Tibetan) species, 35 occur here, and of the 112 Biome 7 (Sino-Himalayan Temperate Forest) species, at least 12 are from here. More are likely to be found after detailed investigations.

The important breeding bird species recorded here are Tibetan Snowcock *Tetraogallus tibetanus*, Black-necked Crane *Grus nigricollis*, Ruddy Shelduck *Tadorna ferruginea*, Common Redshank *Tringa totanus*, Tibetan Sandgrouse *Syrrhaptes tibetanus*, Snow Pigeon *Columba leuconota*, Robin Accentor *Prunella rubeculoides*, White-winged Redstart *Phoenicurus erythrogaster*, Plain Mountain-finch *Leucosticte nemoricola*, Brandt's Mountain-finch *Leucosticte brandti*, White-rumped Snowfinch *Onchostruthus taczanowskii*, Black-winged Snowfinch *Montifringilla adamsi*, Plain-backed Snowfinch *Pyrgilauda blanfordi*, Rufous-necked Snowfinch *Pyrgilauda ruficollis*, Ground Tit *Pseudopodoces humilis*, Yellow-billed Chough *Pyrrhocorax graculus*, Lesser Sand Plover *Charadrius mongolus*, Golden Eagle *Aquila chrysaetos* and Little Owl *Athene noctua*.

Some of the non-breeding birds are Lesser Kestrel *Falco naumanni*, Bar-headed Goose *Anser indicus* and Common Hoopoe *Upupa epops*. A pair of Brown-headed Gull *Chroicocephalus* (= *Larus*) *brunnicephalus* was sighted on Lake Tso Lhamo in May 2003.

OTHER KEY FAUNA

The larger mammals show local movement in search of food and shelter, while strictly resident animals are generally burrow-dwelling and spend the severe winter hibernating.

Important fauna include Kiang *Equus kiang*, Argali or Nayan *Ovis ammon*, Tibetan Gazelle *Procapra picticaudata*, Blue Sheep *Pseudois nayaur*, Brown Bear *Ursus arctos*, Snow Leopard *Panthera uncia*, Eurasian Lynx *Lynx lynx*, Red Fox *Vulpes vulpes* and Grey Wolf *Canis lupus*, all nine species protected under Schedule I of the Indian Wild Life (Protection) Act 1972. The Snow Leopard and Argali are globally Threatened. Smaller animals include Woolly Hare *Lepus oiostolus*, Himalayan Marmot *Marmota himalayana*, Royle's Pika *Ochotona roylei*, Voles *Alticola* spp., and Long-eared Bat *Plecotus auritus*. Sikkim Snow Toads *Scutiger sikkimensis* and *S. boulengeri* inhabit almost all the wetlands in the area. Interestingly, Snow Toads are found in the brackish lake Gyam Tsona, the freshwater glacial lake Tso Lhamo and also in thermally active areas like Lake Gurudongmar and the Yumesamdong hot springs found in this IBA.

LAND USE

- Forestry
- Military and BRO / GREF
- Nature conservation and research
- Tourism / recreation

CONSERVATION ISSUES

- Military overuse especially near lakes
- Extensive road network by GREF
- Poaching
- Feral dogs
- Grazing

The entire IBA is located on the international border with Tibet (China). Hence there is massive military deployment for security reasons in the form of manpower and heavy machinery including vehicles. Of necessity, most camps are located near water sources, often above them. As a result there is every chance of polluting the water bodies that form the source of Sikkim's lifeline, the River Tista. These lakes are stopover sites for migratory waterfowl.

Diversion of the Mirdo spring feeding Lake Gyam Tsona in 1994 has caused the 54 ha lake to dry up into a small pond. This lake was the best wetland in Sikkim for waterfowl and over 200 Northern Pintails *Anas acuta* and other species have been counted here (Ganguli-Lachungpa 2002) in the past. Nowhere else in Sikkim has this number been recorded.

The Garrison Road Engineering Force (GREF) and the Border Roads Organisation (BRO) deploy a large non-native labour force to maintain the extensive road network on the plateau. The labourers maintain shifting camps almost

throughout the year. In addition to permanently disrupting the fragile ecology of these alpine grasslands and nesting sites of most of the ground and hole nesting birds, there have been instances of snaring of wildlife and collection of medicinal plants as well as removal of the slow growing Juniper and Rhododendron bushes for fuel wood.

Both the military and GREF/BRO need to be concerned about the large population of about 250 free-ranging stray and feral dogs which can now be seen roaming in small packs over the plateau preying upon Brahminy Shelduck chicks, Himalayan Marmots, Woolly Hare, Voles and other animals. The Tibetan Mastiff, once used as livestock guardian by the yak and sheep herding nomadic graziers (Dokpas), is now extinct from Sikkim (Ganguli-Lachungpa and Rahmani 2002).

A series of minefields laid along the international border are also a cause for concern as their loose fencing needs constant maintenance. Minefield casualties of wildlife such as Kiang, Argali (Nayan) and Tibetan Gazelle, though common, are not viewed very sympathetically so far. These minefields further limit the grazing areas available to the wild herbivores and domestic livestock. They, as a result, put pressure on the sparse grasses and vegetation of the area as well as ground-nesting birds such as Horned Larks, hole- and burrow-nesting Snowfinches and also disturb Black-necked Crane feeding areas like Yum Tso. The wild herbivores are trans-border migrants, but their movement is restricted due to military deployment. There is a livestock population of c. 1,000 yaks and 2,000 sheep that are grazed by the last surviving fifteen families of nomadic Dokpas numbering less than a 100 individuals.

A new pressure is slowly surfacing with the area being opened up for tourism especially to Gurudongmar Tso (Lake), with its attendant problems of garbage and vehicular diesel pollution.

The State Forest Department has formed Joint Forest Management Committees (JFMC) at Lachen, Thangu and Lachung but there is a need for a Trans-Himalayan JFMC especially for this IBA.

Medicinal Plants Conservation initiatives of the State Forest Department have just begun and there is a vision to develop, over a period of time, home herbal gardens, medicinal plant farms and Tibetan Amji training centres attached to monastery schools. Medicinal Plant Conservation Areas and Medicinal Plant Development Areas are also planned to reduce pressure on the wilderness areas and to provide alternative livelihoods to the tribal people dependent on this IBA.

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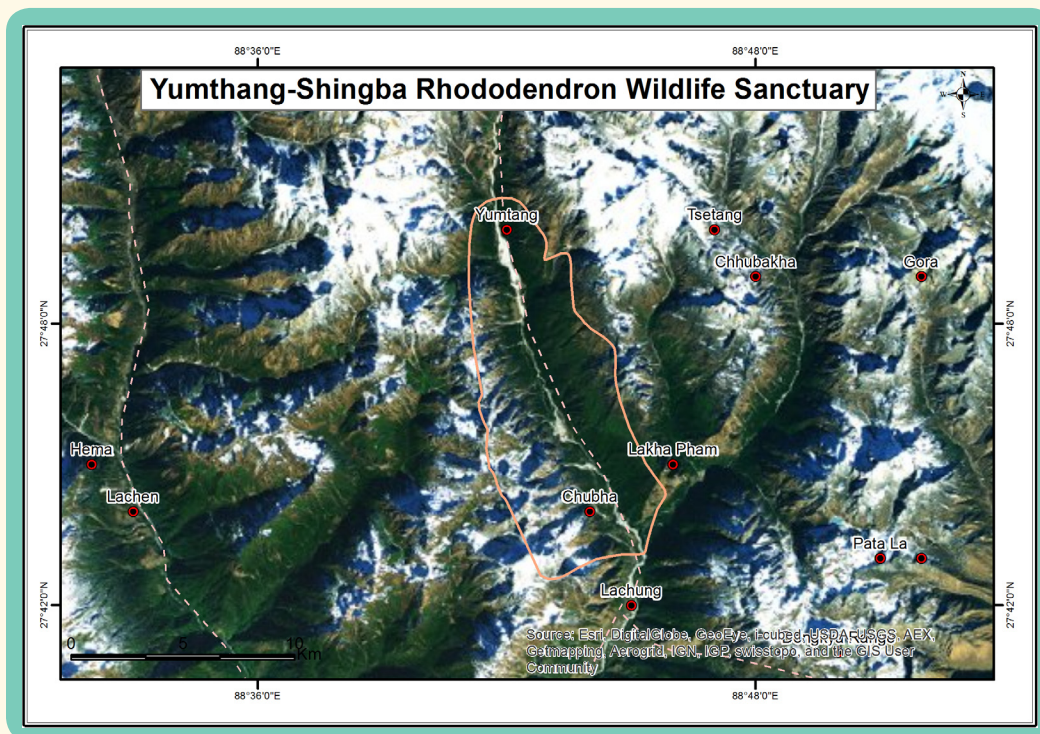
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YUMTHANG-SHINGBA RHODODENDRON WILDLIFE SANCTUARY

IBA Site Code	: IN-SK-11	Rainfall	: Not available
State	: Sikkim	Temperature	: -20 °C to 25 °C
District	: North Sikkim	Biogeographic Zone	: Trans-Himalaya
Coordinates	: 27° 50' 28" N, 88° 44' 21" E	Habitats	: Himalayan Moist Temperate, Subtropical Broadleaf Hill Forest, Subtropical Pine Forest, Alpine Moist Scrub, Alpine Moist Pasture
Ownership	: State Forest Department		
Area	: 43,000 ha		
Altitude	: 3,234 msl to 3,700 msl		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 130: Eastern Himalaya), A3 (Biome 5: Eurasian High Montane, Biome 7: Sino-Himalayan Temperate Forest, Biome 8: Sino-Himalayan Subtropical Forest)

PROTECTION STATUS: Wildlife Sanctuary, established 1984.



GENERAL DESCRIPTION

Straddling the Yumthang river, the Sanctuary which lies beyond the frontier village of Lachung in North Sikkim, is characterised by Temperate Silver Fir-Rhododendron forest at the head of the narrow Lachung Valley surrounded by towering snowy mountains. Rhododendron trees laden with trailing lichens provide good habitat for avifauna and flora. Shingba Rhododendron Sanctuary is home to the endemic *Rhododendron niveum*, the State Tree. Yumthang meadows adjacent to Yumthang-Lachung river provide shingle beds for Ibisbill *Ibidorhyncha struthersii*, meadows for Yak and feeding areas for wagtails, pipits, larks, Grandala *Grandala coelicolor* and other species.

Abies densa, *Picea*, *Rhododendron*, *Juniperus*, *Acer* spp. and ground flora such as *Primula*, *Potentilla*, *Aconitum*

spp. and other alpine herbs are seen. The earlier dense stands of fir and rhododendron were used as timber and removed for firewood and road construction. After the area was declared protected, much of the fallen material was left as such providing good habitat for wildlife. Today young fir trees inside the protected area show good natural regeneration.

AVIFAUNA

Not much information is available on the general bird life of this site, except for opportunistic observations. The globally Threatened Wood Snipe *Gallinago nemoricola* is occasionally seen in the Rhododendron-Fir forest of Shingba, and Ibisbill breeds on the shingle beds of Yumthang Chu in small numbers, usually not more than two pairs. Grandala,

a local altitudinal migrant, is seen sometimes in apparently all-female flocks. Blood Pheasant *Ithaginis cruentus* and Himalayan Monal *Lophophorus impejanus* breed in the higher reaches of the Sanctuary while Himalayan Griffon *Gyps himalayensis* is a resident of the cold desert to the

VULNERABLE

Wood Snipe	<i>Gallinago nemoricola</i>
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NEAR THREATENED

Himalyan Griffon	<i>Gyps himalayensis</i>
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ENDEMIC BIRD AREA 130: EASTERN HIMALAYAS

Hoary-throated Barwing	<i>Actinodura nipalensis</i>
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BIOME 5: EURASIAN HIGH MONTANE (ALPINE AND TIBETAN)

Snow Partridge	<i>Lerwa lerwa</i>
Tibetan Snowcock	<i>Tetraogallus tibetanus</i>
Tibetan Partridge	<i>Perdix hodgsoniae</i>
Ibisbill	<i>Ibidorhyncha struthersii</i>
Snow Pigeon	<i>Columba leuconota</i>
Tibetan Lark	<i>Melanocorypha maxima</i>
Hume's Short-toed Lark	<i>Calandrella acutirostris</i>
Rosy Pipit	<i>Anthus roseatus</i>
Grey-backed Shrike	<i>Lanius tephronotus</i>
Altai Accentor	<i>Prunella himalayana</i>
Robin Accentor	<i>Prunella rubeculoides</i>
White-winged Redstart	<i>Phoenicurus erythrogaster</i>
Grandala	<i>Grandala coelicolor</i>
Smoky Leaf-warbler	<i>Phylloscopus fuligiventer</i>
Plain Mountain-finch	<i>Leucosticte nemoricola</i>
Brandt's Mountain-finch	<i>Leucosticte brandti</i>
Streaked Great Rosefinch	<i>Carpodacus rubicilloides</i>
Ground Tit	<i>Pseudopodoces humilis</i>
Yellow-billed Chough	<i>Pyrhcorax graculus</i>

BIOME 7: SINO-HIMALAYAN TEMPERATE FOREST

Blood Pheasant	<i>Ithaginis cruentus</i>
Himalayan Monal	<i>Lophophorus impejanus</i>
Speckled Woodpigeon	<i>Columba hodgsonii</i>
Nepal House-martin	<i>Delichon nipalensis</i>
White-collared Blackbird	<i>Turdus albocinctus</i>
Gould's Shortwing	<i>Brachypteryx stellata</i>
White-throated Redstart	<i>Phoenicurus schistaceus</i>
Black-faced Laughingthrush	<i>Garrulax affinis</i>
Orange-barred Leaf-warbler	<i>Phylloscopus pulcher</i>
Large-billed Leaf-warbler	<i>Phylloscopus magnirostris</i>
Orange-gorgeted Flycatcher	<i>Ficedula strophilata</i>
Rufous-vented Tit	<i>Parus rubidiventris</i>
Grey-crested Tit	<i>Parus dichrous</i>
Yellow-browed Tit	<i>Sylviparus modestus</i>
Fire-tailed Sunbird	<i>Aethopyga ignicauda</i>
Himalayan Greenfinch	<i>Carduelis spinoides</i>
Red-headed Bullfinch	<i>Pyrhula erythrocephala</i>
Spotted-winged Grosbeak	<i>Mycerobas melanozanthos</i>
Gold-naped Finch	<i>Pyrhoplectes epauletta</i>

BIOME 8: SINO-HIMALAYAN SUB-TROPICAL FOREST

Short-billed Minivet	<i>Pericrocotus brevirostris</i>
Rufous-chinned Laughingthrush	<i>Ianthocincla rufogularis</i>

north. Gould's Shortwing *Brachypteryx stellata*, Rufous-bellied Crested Tit *Parus rubidiventris* and the restricted range Hoary-throated Barwing *Actinodura nipalensis* are common in forest patches. The Fire-tailed Sunbird *Aethopyga ignicauda* is conspicuous when Rhododendrons are in bloom. Rufous-bellied Eagle *Hieraaetus kienerii* was sighted in Yumthang in June 1984. Jungle Crows are now resident at this altitude of c. 4,000 m with increasing tourist pressure.

This IBA lies at the interface of Biome 5 (Eurasian High Montane, Alpine and Tibetan) and Biome 7 (Sino-Himalayan Temperate Forest). Therefore, species of both biomes are represented. It has alpine meadows and scrubs, so we get Tibetan Partridge *Perdix hodgsoniae*, Tibetan Snowcock *Tetraogallus tibetanus* and Hume's Short-toed Lark *Calandrella acutirostris*, while at slightly lower altitude where Montane Broadleaf Evergreen and Mixed Broadleaf-Coniferous Forest are found, species representing Biome 7 predominate.

BirdLife International (undated) has listed 48 species in Biome 5, out of which 19 have been seen in this IBA. The Biome 7 has a long list of 112 species, of which 19 are found here. Looking at the intact habitat and the fact that no one has conducted detailed study on the avifauna of this site, more species of this biome are likely to be found here. Interestingly, two species of Biome 8 (Sino-Himalayan Subtropical Forest) have also been reported from this site: Short-billed Minivet *Pericrocotus brevirostris* and Rufous-chinned Laughingthrush *Garrulax rufogularis*. This is not unusual as there is a very diffuse borderline between biomes, and secondly, birds of the Himalaya, like any mountain region in the world, show seasonal altitudinal movements.

OTHER KEY FAUNA

Notable mammals include Red Panda *Ailurus fulgens*, Alpine Musk Deer *Moschus chrysogaster*, Yellow-throated Marten *Martes flavigula*, Himalayan Weasel *Mustela sibirica*, Himalayan Mouse-Hare *Ochotona roylei*, Long-eared Bat *Plecotus auritus*, Himalayan or Nepal Grey Langur *Semnopithecus schistaceus* and other typical temperate species. The enigmatic caterpillar-fungus *Cordyceps sinensis*, which is a highly prized species, is found in very restricted patches at the upper limits of the Sanctuary, but is yet to be recognised as a forest produce by the State Forest Department. In the river, the exotic fish Brown Trout *Salmo trutta* was introduced by the State Forest Department in the 1980s, while suitable sheltered water bodies harbour the Sikkim Snow Toad *Scutigera sikkimensis*. (Anon. 2003).

LAND USE

- Military
- Nature conservation and research

CONSERVATION ISSUES

- Military, BRO and Police use
- Forest grazing
- Tourism/mountaineering expeditions
- Poaching
- Collection of Junipers etc. for incense

The Lachung-Yumthang Valley lies along the western flanks of the Chumbi Valley of Tibet. Hence this IBA has considerable military and road maintenance personnel presence and a small but significant State Police presence. The North Sikkim Highway bifurcates at the low altitude township of Tsunghang, 25 km away and continues right up to Zadong at Yumesamdong for c. 50 km. This was also the old trade route to Tibet across Dongkia La. There is a need for constant maintenance of this road due to considerable traffic and in fact the Yumthang 'meadows' were created as a result of past timber barter across the border and the more recent removal of the Fir forest to make the road. The State Forest Department had also attempted timber extraction from this region in the 1980s.

Presence of free-ranging stray dogs around cantonments is noticeable. As more Lachungpa tribals look forward to alternative livelihoods like tourism, livestock, cows and horses are often let loose and some virtually abandoned. Yaks however are herded as they still fetch good returns (Anon. 2003). These graze in the Shingba-Yumthang-Yumesamdong region during summer, migrating to 'tree forests' in lower altitudes in winter. This is in sharp contrast to the Dokpa yak herders in Tso Lhamo IBA who migrate to higher wind-blown apparently barren pastures in winter (Ganguli-Lachungpa and Rahmani 2003).

The military and the local mountaineering institute use the area for their exercises which often take them to areas not normally accessible to casual visitors. During a recent tourist expedition, Musk Deer traps in the form of live

Rhododendron bushes worked into hedges were found in the higher reaches of Yumthang Valley (Ganden Lachungpa *pers. comm.* 2002) and during a recent Japanese botanical expedition, porters found and collected *Cordyceps sinensis* (Til Bahadur Subba *pers. comm.* 2003).

Tourism is a booming industry in the state and the Yumthang-Lachung package sees up to 200 vehicles per day plying in this small IBA during summer when the rhododendrons are in bloom or during winter when there is snowfall. The fallout of this enterprise in the form of garbage and vandalism, noise pollution, deforestation due to increased demand for firewood, disturbance by picnickers to breeding birds like Ibisbill, wagtails and pipits is already apparent and needs to be addressed.

Collection of wild edible and medicinal plants and plants with religious significance has always been a traditional activity but commercial harvesting of the same has been banned for five years by the State Forest Department (Anon. 2003). The Forest Department has also established Eco-Development Committees (EDCs) in Lachung village, 'Smriti Van' – a 'Memorial Forest' fenced plot for tree plantation at Yumthang, and further seeks to establish medicinal plant conservation and development areas in this IBA.

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